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January 1991 Vol. X No. 6

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Letters to the RAINBOW

Filing with Tapes

Editor:

In the March 1988 issue of THE RAINBOW in the Utilities section of Novices Niche, I read about creating data files for a 16K disk system (Page 74). The article was written by Raymond Doss. Mr. Doss stated his program can be modified for tape systems. What do I have to change to get this file system working with tapes?

Charles Crutchfield
 5649 W. Virginia Avenue
 Phoenix, AZ 85035

First, since you are planning to use the routine for tape, remove the request for a filename extension from Line 100. Now change the device number, #1, to #1 in lines 100, 110, 120, 140, 150 and 180. Finally change EOF(1) in Line 160 to EOF(-1).

Kudos to Eversoft, Ltd.

Editor:

I'm writing to tell you about the heartwarming treatment I received from Eversoft of Arlington, Washington. I was looking for two software programs, and I wrote to several of THE RAINBOW's advertisers. I received a letter from Eversoft stating they did not have the programs. A short time later I received another letter from Eversoft directing me to an ad in the October issue of THE RAINBOW for a similar program, but from a different company. I thought this was a very caring thing to do. Hurrah for people like those at Eversoft.

L. Grube
 St. Petersburg, Florida

Looking for Flippies

Editor:

I commend THE RAINBOW for a great CoCoFest in Atlanta. The accommodations and sponsors were outstanding. The seminars were very informative and I learned about the programs I am currently using and even more about structuring my own. With the help of Three C's Projects I was able to eliminate a glitch in my backup copy of their software, and I am now on to conquering other worlds.

I have been unable to locate DSDD diskettes for my FD-501 drive. The disks I purchased would not format — I received the infamous I/O Error. I returned them and went to Radio Shack where I saw the DSDD 40-track disks, but these did not have twin

notches or alignment holes. I bought a few and notched one, but still could not format. Where can I find true double-sided disks?

Once again, thank you for your CoCoFest. It brought a new era of programming into my home. Keep up the good work!

Roger Rance
 4700 Brossy Circle #98
 Charleston, SC 29418

We are glad to hear you enjoyed the CoCoFest in Atlanta. However, while we attended the show, it was sponsored by CoCo Pro!, a RAINBOW advertiser. We're sure they'll be happy, too.

Standard DSDD disks do not have the necessary second write-protect and index timing hole. The timing hole is required for formatting a new disk. Several wholesale disk companies offer these disks at special request, but you may find the higher price makes it impractical.

A Powerful Caret

Editor:

I've just purchased a CoCo 3 and a subscription to THE RAINBOW. I have noticed in some of your programs that the ^ is used. Is there another key on the CoCo 3 that replaces it?

Billy Batton
 Winter Haven, Florida

The ^ symbol is called a caret. It is used by computers to denote a variable or number raised to a power. For example, X^2 means "square the value stored in Variable X." The CoCo uses an up-arrow symbol to denote the caret, but printers accurately print the actual character. To generate a caret, simply press the up arrow key.

The Trouble with Home Publisher . . .

Editor:

I am having a problem with Tandy's Home Publisher. What appears on the screen is not what I get on the printer. If I select 80 characters per line, I get 60. If I select 60, I get 40. No matter what point size I choose, the printer gives me the next larger size. I have written to Tandy and received a corrected driver disk, but I'm getting the same results. I wrote to Tandy again and was informed that there is no problem with the program. I have visited my local Radio Shack stores without results.

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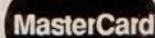
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Since I can't seem to get support from Tandy, I am turning to THE RAINBOW and the CoCo Community for help. If anyone has any advice, I would greatly appreciate it. My equipment consists of a 128K CoCo 3, FD-502 drive and DMP 132 printer with the Tandy High Resolution Joystick Interface and Metric Industries Model 101 serial-to-parallel interface.

Douglas Bacon
108 Maromas Road
Middletown, CT 06457

Editor:

I have a Color Computer 3 with one disk drive, a B/W television and a DMP-107 printer. I've purchased several programs and find only one of them difficult to understand and use. The culprit is *Home Publisher*. My problems are numerous and I'm getting tired of not being able to adequately use the program.

First of all, the program only prints in Tandy mode, which is OK until I want to use another program with the printer. Also, I can never get the printer to print one column of print (newsletter style) as opposed to two or three columns the first time despite following all start up procedures. I must select three columns, then two columns, then it might print the one column. When entering information on the screen, the margins are not set as wide as the program's visual display shows. It's approximately 4½ inches from the left margin, which is extremely misleading. I've gotten used to having the boundaries displayed to know where to stop, but this slows the input process as well as my creative juices. The print is very large, which is not Tandy mode print. Can you offer assistance in solving my problems with *Home Publisher*?

My second major problem is with the

For the Love of CoCo

Cecil Houk, owner of Rulaford Research, sent us this picture of the license plate on his car. We've seen the plate game played countless ways, but few are as simple and meaningful as this. Hmm... we wonder if anyone has put 6809#1 on their plates?



basic use of the computer and the printer. I am not a programmer, but would like to know how to just type something on the computer and have it print without having to type line numbers. Is a definitive program necessary to accomplish this? If so, what is it and how much does it cost?

So far I'm not finding the CoCo 3 too terribly user-friendly!

Sanceria Thomas
1105 Mount Olive Avenue
University City, MO 63130

Printing text with your computer, such as a letter or memo, requires a word processor or text editor. Many advertisers carry such products. See the ads for Microcom, Danosoft, Owl-Ware and Cer Comp. In the meantime, every computer has a learning curve. Hang in there and you'll do fine.

Exploring a New World

Editor:

I should be tinkering with my naive attempts at windows, but instead, here I am writing another letter to the Editor.

A few months ago I wrote to gripe about what's happening to our magazine. I stand firm on my complaint. I don't like the trend I'm seeing. There must be a way to reverse this backward evolution. (And I hate the saddle-stitch format!) However, this time I'm writing in defense of THE RAINBOW and the CoCo Community as a whole. (And, by the way, to thank you for giving us back our protective wrapper. It's a step in the right direction.)

The letter from Jim Price in your September issue has been gnawing on me and it demands a response. He would have us believe that the evil forces of "OS-9 and machine language gibberish" have lately invaded, and are taking over, THE RAINBOW. If his feelings are, as he suggests, shared by other CoCo users, then we are in big trouble.

I believe Mr. Price should take a close look at the very issue in which his letter appears. Of course, he probably won't buy the issue, since those horrible words "Assembly Language" appear right on the front cover.

The theme of the issue is education and Lonnie sums it up rather nicely in "Print #2." Isn't the CoCo, among other things, a tool for learning? Of course it is! Isn't THE RAINBOW our prime support for that learning? Of course it is! Is Mr. Price's stagnant outlook infecting our community? I certainly hope not!

I've been learning with the CoCo for several years and have found the more I learn the more useful my CoCo becomes. I never would have tried my hand at assem-

bly language had it not been for Bill Barden's ravings in THE RAINBOW. I've learned to work with it and now know how useful it can be. I've gained this knowledge through articles devoted to such "gibberish" published in THE RAINBOW.

Until last Christmas, I was frustrated because THE RAINBOW was becoming primarily a CoCo 3 magazine with little "good usable material" for my CoCo 2. Unlike Mr. Price, though, I accepted reality. THE RAINBOW was simply growing with the CoCo and I was fast becoming part of a dwindling minority.

I was also intimidated by OS-9. It was intriguing, but seemed too complex and hostile. I didn't have it and had no plans to buy it. I'd always read the articles, though, trying to learn why those "weirdos" were so attached to it.

Last Christmas I finally gave in and bought a CoCo 3. A month later I dared and bought OS-9. Now I'm just as lost and confused as I was several years ago when I powered up my first 4K "Gray box." And I'm just as excited. OS-9 Level II is mind-boggling, but its power is even more mind-boggling. I'm learning and, even as a stumbling novice, I've stunned a couple of friends by casually making my "cheap little CoCo" do things their high-dollar PCs can't. Why? Because articles devoted to such "gibberish" are published in THE RAINBOW!

Will I shun BASIC just because I'm trying to learn something new? No! I've used BASIC for years. It's an old friend and I'll continue using it. (I did, however, purchase Burke & Burke's RSB. Running BASIC while exploring OS-9 has great potential.)

Do I expect THE RAINBOW to devote itself to OS-9 just because it's what I'm trying to learn? Not on your tintype! I'll type in the one-liners and the listings in "Novices Niche" or anything else. I'll read "Turn of the Screw" since I'm an engineer and a hardware hacker. I'll read the consultations and the product reviews. I'll digest every word cover-to-cover and grumble because the covers are too close together these days. I may or may not find some "good usable material". The odds are I'll learn, or re-learn, something before I'm done and will enjoy the reading.

The fact that I'll also type in the OS-9 listings does not mean I'm some kind of freak, as Mr. Price suggests. It simply means I'm exploring a new world. It's a very impressive new world and, though I'll consider myself a novice for a long time to come, I already understand why those "weirdos" have been pushing it for so long. I also understand why OS-9 and machine

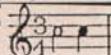
Continued on Page 93

CoCo Graphics Designer Plus

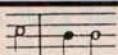
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Keeping the Spirit

What is special about the CoCo Community? I think it is best exemplified by the word *ruarch*, a Hebrew word that means spirit and vigor. Even a decade after the first Color Computer was introduced, there is still new spirit and vigor in our community. This ongoing vitality is due to new programs for our CoCos, more powerful upgrades and also the new members of our Community.



Those who regularly read this space have seen examples of how the CoCo can change lives. To borrow from Ivory Soap, I claim that 99 and 44/100 percent of these changes have been improvements. How hath some of these changes been wrought? Let me share with you a letter I received a couple of months ago, and my response.

Dear Lonnie,

I have just completed what will be my final article for THE RAINBOW. It has been my pleasure to contribute to your fine publication, the little newsletter that grew!

Computer Island is approaching the end of its run. Orders and inquiries are few and far between. We are winding down gracefully and with no regrets.

What an experience this has been. We have learned so much, met so many people and savored their differences as well as their similarities. In addition to all the practical things we learned, such as accounting, advertising, programming, offset printing, state sales tax returns and non-reproducing graph paper, we also learned that opportunity still exists. A simple statement, "let's see if we can sell this program," can lead to Computer Island. We grew from the experience, as did our children.

Speaking of children, we have some news. Our oldest child, Adam, was married on October 28th. Can you believe the little guy who helped at RAINBOWfests and worked with us at home is now a college graduate and a married man? He's a big guy now! Our other RAINBOWfest helper, David, is a high school senior and Shari (the baby), an infant when Computer Island began, is in fourth grade. The years have certainly flown by, but they surely have been good years.

Thanks for all your help over these years. Having THE RAINBOW as an advertis-

ing vehicle was the key to Computer Island's success. Lots of companies have good products, but no way to let the public know about them. You provided us the means to get the message out to a targeted market. What could be better? We appreciate it so much.

Keep in touch and stay well. Regards to your family. Best of luck in all Falssoft endeavors.

Sincerely,

Steve and Cheryl Blyn

Dear Steve and Cheryl,

I remember when I would call to discuss advertising or one of your new products and Cheryl would interrupt negotiations because Shari was crying for her bottle. I also remember when Adam "disappeared" at RAINBOWfest for a half an hour to look at games somewhere else. And that sales at the shows picked up considerably when Cheryl was present. She became the "boss of the booth."

But most of all I think the whole CoCo Community remembers the thousands of hours you have devoted to it down through the years with both Computer Island and also through Steve's magnificent columns! You have touched so many lives. We all owe you a debt of thanks.

Steve, I know with your successful career you have had little time to develop your line in the past years, but your columns have been excellent. And your contributions to this Community beyond comprehension. We will miss you and your entire family.

Best of luck, good wishes and fond thoughts from all of us.

— Lonnie Falk

...Just think of any word processing feature, chances are Word Power has it...packs a lot of features...excellent word processor..." **Word Proc. Comparison**-April 1989 Rainbow; Pg 26.

Word Power 3.3

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Blazing Fast! Runs at **2 Mhz** and uses the standard text screens for lightning fast execu-



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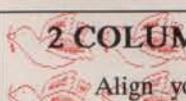
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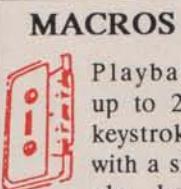
Type a letter, follow it with a list of names & addresses and have Word Power print out personalized letters. Its that easy!



SAVING / LOADING

Creates ASCII files that are compatible with other word-processors, terminal programs, etc. Allows directory point & select for easy loading/saving, **Automatic Backup**, file erase, free space display. **ARE YOU**

SURE? prompts prevent accidental deletes. The **Auto-Save** feature automatically saves text to disk during user-defined intervals for peace of mind. Supports double-sided drives.



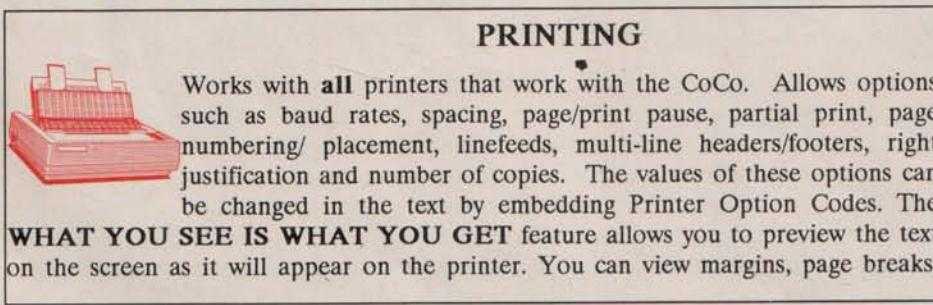
MACROS

Playback up to 250 keystrokes with a single key! Automate multiple tasks with a single key! You'll love it!



SPELLING CHECKER

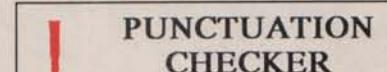
Word Power 3.3 include a **80,000** word spelling checker which finds and corrects mistakes in your text.



PRINTING

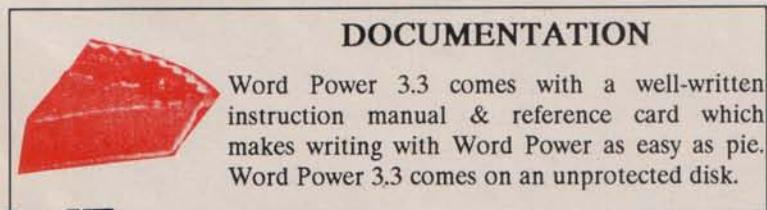
Works with **all** printers that work with the CoCo. Allows options such as baud rates, spacing, page/print pause, partial print, page numbering/ placement, linefeeds, multi-line headers/footers, right justification and number of copies. The values of these options can be changed in the text by embedding Printer Option Codes. The

WHAT YOU SEE IS WHAT YOU GET feature allows you to preview the text on the screen as it will appear on the printer. You can view margins, page breaks,



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DISK MASTER

3

Seven menu-driven utilities allowing you to take control of your disk system on a CoCo 3



by Mike Jorgenson



*D*isk Master 3 is a comprehensive system of utility modules for the Color Computer 3. The system consists of a boot program, a configuration program and seven utility programs that operate in a modular fashion. *Disk Master 3* allows you to edit disks, copy tagged files, sort disk directories and more.

I have taken considerable care to ensure uniformity and compatibility of *Disk Master 3* with most custom BASIC enhancement utilities such as *ADOS-3*. All of the utility programs have three common features: Pressing D allows you to change the working drive; pressing V lets you view a disk's directory and you can press Q to quit and return to the menu.

The *Disk Master 3* system uses PCLEAR1 for many of its routines. If PMODE graphics have been used prior to loading, the system will not operate—even though this system is both reliable and efficient, it should be used only on start-up. The high-speed mode (POKE65497,0) is used in various routines for data processing, but never during disk access.

Follow the system prompts carefully when changing disks, especially when working with your master. The system makes use of error-trapping routines, but some custom BASIC enhancement utilities sidestep these traps when a disk-access error occurs.

Before using *Disk Master 3* be sure to run CONFIG to establish your custom operating parameters, which have been pre-set for Disk BASIC. It is a good idea to make a backup copy of your system master disk immediately after creating the custom master. Now run BOOT when you want to use the system.

The Configuration Program

This program allows you to set up the various operating parameters and/or helpful features used with this system. As a safety measure, *Disk Master 3* will not operate unless the master disk has been configured. The system can check this since CON-

Mike Jorgenson is an outdoorsman who likes to read and write fiction stories. He also enjoys music, sports, computer programming and working with electronic equipment. Mike can be contacted at 749 Tower Blvd., Lorain, OH 44052, (216) 282-9355. Please include an SASE when requesting a reply.

F16 saves your custom configuration data in an unused portion of the directory track, Track 17. The features that can be pre-set are shown in Figure 1.

Once the system is configured, these operating features are always provided on start-up. Should you find it necessary to change a pre-set parameter, you will have to reconfigure the system master disk. However, disk verification and the default text-screen width can be alternately toggled from the utility loader program.

The Loader Program

BOOT is the system loader for the utility modules. It can also be used to customize your BASIC DOS, depending on how it is configured. Pressing ESC clears the system from memory and exits to BASIC while restraining any customized features.

F1 is used to alternate between the 40- and 80-column text screen default. Pressing F2 toggles disk verification on or off as needed. Pressing ALT displays the disk directory on the default screen. The display includes extensions, granule allocations and any free space that remains.

Edit Master 3

This module is used to scan or edit a disk by track and sector. When editing a disk, move the cursor to the character to be changed and enter the CHR\$ code for a new character. Then resave the sector to disk by pressing W when finished. Press ESC to abort the Edit mode.

Monochrome monitor display — disables colorburst
Foreground/background colors — 32/40/80 column text
Default text screen width — select 40/80 columns
Read/write I/O verification — set verify on or off
True lowercase in 32-column width — as 40/80 column text
40-track drive operation — allows 78 granules per disk
Drive step rate — for smoother drive operation
Double-sided drives option — 0/2 and 1/3 configuration
Select a printer baud rate — 6 options (600-9600)

Figure 1: *Disk Master 3* Configuration Parameters

When scanning a disk, the up and down arrow keys provide continuous scrolling. The Spacebar can be used to pause and resume the display. The left and right arrow keys cause the program to display the next sector of the track and then pause for an input command.

List Master 3

This module is useful for reviewing an ASCII text or data file. The output can be

directed to the monitor/TV or printer. You can specify characters per line, lines per page, space between paragraphs and auto-page numbering as needed. You can also review or make a hardcopy of any BASIC program that is saved in ASCII format.

When making a hardcopy, pressing ENTER sets the output default as indicated. The printout is intended for standard or legal typewriter paper and printing pauses at the end of each page.

When reviewing a file onscreen, the Spacebar pauses and resumes the display. The F1 key is used to toggle between the user's pre-set screen-color selections and the inverse of those colors. Pressing F2 starts a file and sends the output to the printer. Use ESC to exit the File Review mode.

Test Master 3

This module provides an extensive diagnostic drive test. As a safety precaution, you should always insert a blank, formatted disk into the working drive before proceeding with *Test Master 3*. This module performs the following tests:

Step the working drive in or out
Step the head to a specified track
Re-set the drive head to Track 0
Toggle the drive motor on or off
Check the drive indicator light and
the write-protection routine
Read and write verification test
Check drive speed (RPM test)

Note that the read/write verification test will not work with any disk having data on its directory track. The disk must be blank.

Track Master 3

This module allows you to make a 35- or 40-track backup to any combination of drives. The module copies five tracks on each pass and has an optional read/write-error bypass routine for problem disks. When the backup is completed, this

module will run again with the same configuration, if needed. A normal 35-track, non-verified, multi-drive backup takes approximately 90 seconds.

Copy Master 3

This module is used to copy or super-copy files to any combination of drives. You can copy everything from one disk to another with the press of a key or copy one or more specified files with a Yes/No/All-

The-Rest prompt. When making a single-drive copy, this utility handles files of up to 10 granules with just one swap.

Note: If you have ADOS-3 in memory or EPROM, using this module to replace existing disk files will distort the display screen.

Kill Master 3

This is similar to *Copy Master 3*, except that a Want to Reconsider? prompt has been added before command execution as a safety measure.

Sort Master 3

This module is used to sort a disk's directory alphabetically, by extension or by file type. This is quick, efficient and quite helpful when organizing a software collection. □

CoCo 3 Disk

<input checked="" type="checkbox"/>	55	120
	95	70
	140	81
	190	197
	240	217
	285	149
	330	193
	END	21

Listing 1: CONFIG

```
0 'DISK MASTER 3
WRITTEN BY MIKE JORGENSEN
COPYRIGHT (C) JANUARY 1991
BY FALSOFT, INC.
10 ' Disk Master 3
15 ' Configure File
20 ' Coco 3 Utility
25 ' Mike Jorgenson
30 '
35 CLEAR2500:D1=PEEK(2394)
40 ONERR GOTO360:ONBRK GOTO370
45 DSKI$ D1.17.18.Y$.Z$:V=VAL(MI
D$(Y$.1,1)):IFV1 OR V>2THENPALE
TTE0.11:PALETTE8.59:GOTO65
50 BG=VAL(MID$(Y$.8,2))
55 FG=VAL(MID$(Y$.10,2))
60 PALETTE0.BG:PALETTE8.FG
65 PALETTE9.52:MID$(Y$.1,1)="1":
FORX=2TO18:MID$(Y$.X,1)="0"
70 NEXT:WIDTH40:CLS1:LOCATE7.0:A
TTR1,0,B:PRINT"><<< Configure Mas
ter 3 >>>":ATTR0,0
75 LOCATE3.5:PRINT"Monochrome Mo
nitor: <Y/N> ? ";
80 GOSUB375:IFQ$="Y"THEN MID$(Y$,
1,1)="2"ELSEIFQ$<>"N"THEN80
85 PRINTQ$:LOCATE3.8:PRINT"32 Co
lumn Color Set <0-63>":PRINT
90 LINEINPUT" Background Palet
te - ";Q$=Q=VAL(Q$):IF
```

```
(Q<1AND Q$<>"0")OR Q>63THEN90
95 IFQ<10THENQ$="0"+Q$
100 MID$(Y$,2,2)=Q$
105 LINEINPUT" Foreground Pale
tte - ";Q$=Q=VAL(Q$):I
F(Q<1AND Q$<>"0")OR Q>63THEN105
110 IFQ<10THENQ$="0"+Q$
115 MID$(Y$,4,2)=Q$
120 LINEINPUT" Foreground Disp
lay - ";Q$=Q=VAL(Q$):I
F(Q<1AND Q$<>"0")OR Q>63THEN120
125 IFQ<10THENQ$="0"+Q$
130 MID$(Y$,6,2)=Q$
135 PRINT:PRINT" 40/80 Column
Colors <0-63>":PRINT
140 LINEINPUT" Background Pale
tte - ";Q$=Q=VAL(Q$):I
F(Q<1AND Q$<>"0")OR Q>63THEN140
145 IFQ<10THENQ$="0"+Q$
150 MID$(Y$,8,2)=Q$
155 LINEINPUT" Foreground Pale
tte - ";Q$=Q=VAL(Q$):I
F(Q<1AND Q$<>"0")OR Q>63THEN155
160 IFQ<10THENQ$="0"+Q$
165 MID$(Y$,10,2)=Q$
170 PRINT:PRINT:PRINT" Set Tex
t Width To 80: <Y/N> ? ";
175 GOSUB375:IFQ$="Y"THEN MID$(Y
$.12,1)="1"ELSEIFQ$<>"N"THEN175
180 PRINTQ$:PRINT:PRINT" Want
Disk Verify On: <Y/N> ? ";
185 GOSUB375:IFQ$="Y"THEN MID$(Y
$.13,1)="1"ELSEIFQ$<>"N"THEN185
190 PRINTQ$:PRINT:PRINT" Do Yo
u Have Lowercase":PRINT" Confi
ged For WIDTH32: <Y/N> ? ";
195 GOSUB375:IFQ$="Y"THEN215
200 IFQ$<>"N"THEN195
205 PRINTQ$:PRINT:PRINT" Want
Lowercase Poke: <Y/N> ? ";
210 GOSUB375:IFQ$="Y"THEN MID$(Y
$.14,1)="1"ELSEIFQ$<>"N"THEN210
215 PRINTQ$:PRINT:PRINT" Do Yo
u Have 40-TRACK":PRINT" Disk D
rive Operation: <Y/N> ? ";
220 GOSUB375:IFQ$="Y"THEN240
225 IFQ$<>"N"THEN220
230 PRINTQ$:PRINT:PRINT" Want
a 40-TRACK Poke: <Y/N> ? ";
235 GOSUB375:IFQ$="Y"THEN MID$(Y
$.15,1)="1"ELSEIFQ$<>"N"THEN235
240 PRINTQ$:PRINT:PRINT" Want
Step Rate Poke: <Y/N> ? ";
245 GOSUB375:IFQ$="N"THENPRINTQ$:
:GOTO285 ELSEIFQ$<>"Y"THEN245
250 PRINTQ$:PRINT
255 PRINT:PRINT" <1> - 30 Mi
llisecond Step Rate.":PRINT:PRIN
T" <2> - 20 Millisecond Step
Rate.":PRINT:PRINT" <3> - 1
2 Millisecond Step Rate.":PRINT
260 PRINT" <4> - .06 Millise
cond Step Rate.":PRINT:PRINT"
Enter a choice ... ";
265 GOSUB375:Q=VAL(Q$)
270 IFQ<1 OR Q>4THEN265
275 MID$(Y$.16,1)=Q$
280 PRINTQ$:PRINT
285 PRINT:PRINT" Double-Sided
Drives: <Y/N> ? ";
290 GOSUB375:IFQ$="N"THEN310
295 IFQ$<>"Y"THEN290
300 PRINTQ$:PRINT:PRINT" Drive
Configure Poke: <Y/N> ? ";
305 GOSUB375:IFQ$="Y"THEN MID$(Y
$.17,1)="1"ELSEIFQ$<>"N"THEN305
310 PRINTQ$:PRINT:PRINT" Print
er Output Poke: <Y/N> ? ";
```

```
315 GOSUB375:IFQ$="N"THEN350
320 IFQ$<>"Y"THEN315
325 PRINTQ$:PRINT:PRINT:PRINT"
<1> - 0600 Baud Rate Output."
:PRINT:PRINT" <2> - 1200 Bau
d Rate Output.":PRINT:PRINT"
<3> - 2400 Baud Rate Output."
330 PRINT:PRINT" <4> - 4800
Baud Rate Output.":PRINT:PRINT"
<5> - 7200 Baud Rate Output.
":PRINT:PRINT" <6> - 9600 Ba
ud Rate Output.":PRINT:PRINT"
Enter a choice ... ";
335 GOSUB375:Q=VAL(Q$)
340 IFQ<1 OR Q>6THEN335
345 MID$(Y$.18,1)=Q$
350 PRINTQ$:DSK0$ D1.17.18.Y$.Z$:
:CLEAR200:WIDTH32:PRINT"OK, YOUR
DISK IS NOW CONFIGURED."
355 PRINT:END
360 PRINT:PRINT" System Functi
on Error Detected !!!":SOUND5.7
365 FORX=1TO1650:NEXT
370 CLEAR200:WIDTH32:END
375 Q$=INKEY$:IFQ$=""THEN375
380 RETURN
385 ' END
```

<input checked="" type="checkbox"/>	65	24
	135	21
	185	167
	265	51
	345	114
	370	123
	420	98
	450	47
	495	76
	550	101
	595	180
	END	247

Listing 2: BOOT

```
0 'DISK MASTER 3
WRITTEN BY MIKE JORGENSEN
COPYRIGHT (C) JANUARY 1991
BY FALSOFT, INC.
10 ' Disk Master 3
15 ' Boot Load File
20 ' Coco 3 Utility
25 ' Mike Jorgenson
30 '
35 PCLEAR1:CLEAR2500
40 RGB:WIDTH32:CLS0:P=1
45 IF PEEK(32762)=1THEN60
50 CLEAR2500,32762:POKE113,0
55 POKE32762,1:VERIFYOFF
60 D1=PEEK(2394):IFP=1THEN120
65 DSKI$ D1.17.18.Y$.Z$:V=VAL(MI
D$(Y$.1,1)):IFV=2THEN POKE57395,
16:POKE57404,19:POKE57413,19
70 IFV<1 OR V>2THEN550
75 FORX=32763 TO 32767:K=K+2:POK
EX,VAL(MID$(Y$.K,2)):NEXT
80 POKE32768,VAL(MID$(Y$.12,1))
85 VF = VAL(MID$(Y$.13,1))
90 LC = VAL(MID$(Y$.14,1))
95 TK = VAL(MID$(Y$.15,1))
100 SR = VAL(MID$(Y$.16,1))
105 DS = VAL(MID$(Y$.17,1))
```

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```

110 PB = VAL(MID$(Y$,18,1))
115 '
120 X=32763:B1=PEEK(X)
125 F1=PEEK(X+1):FD=PEEK(X+2)
130 B2=PEEK(X+3):F2=PEEK(X+4)
135 TW=PEEK(X+5):PALETTE8,0:DIM
FL$(78),GR(78):F$=STRING$(32,191
):G$=STRING$(32,175):H$=CHR$(175
)+STRING$(30,32)+CHR$(175)
140 ON ERR GOT0560:ON BRK GOT058
0:PALETTE12,FD:PALETTE13,0:CLS
145 PRINT@0,F$:PRINT@32,F$:PRINT
@3," <<< DISK MASTER 3 >>> ":";
PRINT@64,G$:FORX=96T0384 STEP32:
PRINT@X,H$:NEXT:PRINT@416,G$::PR
INT@448,F$::PRINT@482,"COPYRIGHT
<C> JANUARY 1988";
150 '
155 IF P=1THEN355
160 IF VF=1THENVERIFYON
165 IF LC<>1THEN180
170 POKE &H167.57
175 POKE &HFF22.21
180 IF DS<>1THEN205
185 POKE &HD89D.1
190 POKE &HD89E.2
195 POKE &HD89F.65
200 POKE &HD8A0.66
205 IF SR=1THENSP=23:ST=3
210 IF SR=2THENSP=22:ST=2
215 IF SR=3THENSP=21:ST=1
220 IF SR=4THENSP=20:ST=0
225 IF SP<1THEN240
230 POKE &HD7C0,ST
235 POKE &HD816,SP
240 IF PB=1THENBP=87
245 IF PB=2THENBP=40
250 IF PB=3THENBP=18
255 IF PB=4THENBP=7
260 IF PB=5THENBP=3
265 IF PB=6THENBP=1
270 IF BP<1THEN280
275 POKE &H96,BP
280 IF TK<>1THEN355
285 TK=40:GR=TK*2-2
290 POKE &HD29D,TK
295 POKE &HD65F,TK
300 POKE &HD682,TK
305 POKE &HD44D,GR
310 POKE &HC735,GR
315 POKE &HC7BB,GR
320 POKE &HC7D0,GR
325 POKE &HC7EF,GR
330 POKE &HCD26,GR
335 POKE &HC8B5,GR
340 POKE &HD534,TK-1
345 POKE &HC75A,1
350 '
355 D$(1)="<1>" - LOAD: Copy Ma
ster 3":D$(2)="<2>" - LOAD: Edi
t Master 3":D$(3)="<3>" - LOAD:
Kill Master 3":D$(4)="<4>" - L
OAD: List Master 3"
360 D$(5)="<5>" - LOAD: Sort Ma
ster 3":D$(6)="<6>" - LOAD: Tes
t Master 3":D$(7)="<7>" - LOAD:
Trak Master 3"
365 POKE65497,0:Q=0:FORX=129T03
21 STEP32:Q=Q+1:FORX=1T027:PRIN
T@X+Y,MID$(D$(Q),Y,1)::NEXT,Y,X
370 POKE65496,0:X=0:PRINT@391."E
nter A Choice ...":PRINT@482,
<F1> <ALT> <ESC> <F2> ";
375 Q$=INKEY$:IFQ$=""THEN520
380 A=ASC(Q$):IFA=4THEN405
385 IFA=103 OR A=226THEN410
390 IFA=64THEN430

```

```

395 Q=VAL(Q$):ON Q GOT0605,610.6
15,620,625,630,635
400 SOUND5,3:GOT0375
405 IF PEEK(2439)=255THENVERIFY
OFF:PRINT@482,"Disk Verification
Is Now Off":GOT0420 ELSEVERIFY
ON:PRINT@482,"Disk Verification
Is Now On.":GOT0420
410 IFTW=1THENTW=0 ELSESETW=1
415 PRINT@482,"Text Display Widt
h Is Now"TW*40+40::POKE32768,TW
420 SOUND100,6:FORX=1T01000
425 NEXT:GOT0370
430 PRINT@482,"View Disk Of What
Drive: 0/3":GOSUB540
435 Q=VAL(Q$):IFQ>3THEN370
440 PRINT@482,"Reading Directory
Of Drive"Q::DSKI$ Q,17,2,X$,Y$
445 DF=0:FORX=3T09:DSKI$ Q,17,X,
Y$,Z$:FORX=1T0128 STEP32:GOSUB45
0:NEXTK:Y$=Z$:FORX=1T0128 STEP32
:GOSUB450:NEXTK,X:GOT0465
450 SB$=MID$(Y$,K,14):L$=LEFT$(S
B$,1):IF ASC(SB$)>127 OR L$=CHR$(
0)THENRETURN ELSEIF L$=CHR$(255)
THEN465 ELSEDEF=DF+1:Y=ASC(RIGHT$(
SB$,1))+1:FL$(DF)=LEFT$(SB$.8)+"
."+MID$(SB$,9,3)
455 GR(DF)-GR(DF)+1:Z=ASC(MID$(X
$Y,1)):IFZ<78THENY=Z+1:GOT0455
460 RETURN
465 IFDF<1THENPRINT@482,"NO FILE
S IN DISK'S DIRECTORY":SOUND5,7
:FORX=1T01500:NEXT:GOT0370
470 K=1:F=FREE(Q)
475 POKE65497,0:ON ERR GOT0555
480 PALETTE0,B2:PALETTE8,F2
485 IFTW=1THEN$=STRING$(23,32):
WIDTH80 ELSESET$=" WIDTH40
490 CLS1:PRINTT$" <<< Direc
tory Of"Q">>>":LOCATE0,6
495 FORX=1TO DF:IF GR(X)<10THENF

```

```

L$(X)=FL$(X)+" "+STR$(GR(X))ELSE
FL$(X)=FL$(X)+STR$(GR(X))
500 IFK=1THENK=0:PRINTT$;FL$(X)"
"; ELSEK=1:PRINT" "FL$(X)
505 NEXT:IFK=1THENPRINTT$"Free =
" F ELSEPRINT" Free = "F:PRINT
510 PRINT:Q$=INKEY$:POKE65496,0
515 PRINTT$" Press Any Key When
Ready ... :::GOSUB540:RUN
520 IFX=0THENX=1:PRINT@406, "
;ELSEX=0:PRINT@406,"...":
525 FORK=1T030:NEXT:GOT0375
530 SOUND5,7:FORX=1T01650
535 NEXT:RETURN
540 Q$=INKEY$:IFQ$=""THEN540
545 RETURN
550 PRINT" << DISK MUST BE CONFI
URED! >>:::GOSUB530:EXEC40999
555 POKE65496,0:GOSUB530:GOT0570
560 POKE65496,0:IF ERN0=26THENPR
INT@482,"File Not In Disk's Dire
ctory":GOSUB530:RUN
565 PRINR@481,"System Function E
rror Detected":GOSUB530
570 WIDTH32:PALETTE12,F1
575 PALETTE13,B1:END
580 WIDTH32:POKE65496,0
585 PALETTE12,F1:PALETTE13,B1
590 CLEAR200,32768:PRINT" ENHAN
CED DISK EXTENDED BASIC DISK
MASTER 3 UTILITY SYSTEM Mike
Jorgenson / JAN 01 1988"
595 PCLEAR4:PRINT:PRINT:NEW
600 '
605 LOAD "COPY/SYS",R
610 LOAD "EDIT/SYS",R
615 LOAD "KILL/SYS",R
620 LOAD "LIST/SYS",R
625 LOAD "SORT/SYS",R
630 LOAD "TEST/SYS",R
635 LOAD "TRAK/SYS",R
640 ' *** END ***

```

<input checked="" type="checkbox"/>	60	247
	95	0
	140	44
	175	168
	255	207
	310	61
	355	218
	385	91
	END	105

Listing 3: EDIT.SYS

```

0 'DISK MASTER 3
    WRITTEN BY MIKE JORGENSEN
    COPYRIGHT (C) JANUARY 1991
    BY FALSOFT, INC.
10 ' Edit Master 3
15 ' Coco 3 Utility
20 ' Mike Jorgenson
25 '
30 CLEAR5000:POKE65497,0
35 DIMFL$(78),GR(78):X=32763
40 D1=PEEK(2394):B1=PEEK(X)
45 F1=PEEK(X+1):FD=PEEK(X+2)
50 F$=STRING$(30,128):G$=STRING$
```

```

(32,191):H$=STRING$(32,175)
55 X$=STRING$(128,128)
60 PALETTE12,FD:ON BRK GOT030
65 PALETTE13,0:ON ERR GOT0410
70 CLS:PRINT@0,G$:PRINT@32,G$::PR
INT@4." <<< EDIT MASTER 3 >>> ":";
:FORX=96T0352 STEP32:PRINT@X,H$:
NEXT:PRINT@416,G$::POKE65496,0
75 PRINT@129," <D>- Change Worki
ng Drive " ::PRINT@193," <E>-
Edit Working Drive Disk ";
80 PRINT@257," <V>- View Working
Drive Disk ::PRINT@321." <Q>=
Quit / Return To Menu ";
85 PRINT@482,"The Working Disk D
rive = "D1;
90 GOSUB400:Q=INSTR("QVED",Q$)+1
:ONO GOT090,420,355,110
95 PRINT@482,"Which Drive 0-3: <
ENTER> ? :::GOSUB400
100 D=VAL(Q$):IFD>3THEN85
105 D1=D:DRIVE D1:GOT085
110 PRINT@129," Edit The Working
Drive Disk ::PRINT@193,F$::PR
INT@257,F$::PRINT@321." <BREAK>
- Abort Disk Editor ";
115 PRINT@194,"";:LINEINPUT"Ente
r a Track: <0-39> ? ";T$:T=VAL(
T$):PRINT@223,CHR$(175);
120 IFT<0 OR T>39THEN70
125 PRINT@258,"";:LINEINPUT"Ente
```

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```

r a Sector: <1-18> ? ";S$:S=VAL(S$):IFS<1 OR S>18THEN70
130 PRINT@384,H$::PRINT@481,F$;
135 PRINT@128,X$:$X;
140 PRINT@66."DRIVE"D1" TRACK" T"
SECTOR"S:DSK1$ D1,T,S,Y$.Z$:POK
E65497,0:FORX-1152T01279:POKEX.A
SC(MID$(Y$.X-1151,1)):NEXT:FORX-
1280T01407:POKEX,ASC(MID$(Z$,X-1
279,1)):NEXT:POKE65496,0
145 IFQ$<>"THENA$=""":GOT0165
150 PRINT@449," <F1> - Abort
<F2> - Edit Arrow Keys Scro
11 By Sector"::GOSUB400
155 Q=ASC(Q$):IFQ$<>CHR$18 THEN190 ELSEI
FQ-9THEN180 ELSEIFQ-103 OR 0-226
THEN30 ELSEIFQ-4THENX-1152:GOT02
95 ELSEIFQ<>10 ANDQ<>94THEN150
160 PRINT@450."Scanning By: Tra
ck & Sector <SPACEBAR> - Pa
use Display"::GOT0175
165 B$=INKEY$:IFB$<>CHR$(32)THEN
175 ELSEPRINT@493."- Resume";
170 B$=INKEY$:IFB$=""THEN170 ELS
EIFB$-CHR$(32)THEN160 ELSE150
175 A$=Q$:IFQ$-CHR$(10)THEN190
180 S-S+1:IFS>18THEN-T+1:S-1
185 IFT>39THENRUN ELSE135
190 S-S-1:IFS<1THEN-T-1:S-18
195 IFT<0THENRUN ELSE135
200 Y-PEEK(X)
205 POKEX,43:FORX-1T020
210 Q$=INKEY$:IFQ$<>"THEN230
215 NEXT:POKEX,Y:FORX-1T030
220 Q$=INKEY$:IFQ$<>"THEN235
225 NEXT:GOT0205

```

<input checked="" type="checkbox"/>
60 144
95 30
135 171
175 153
230 133
290 223
340 139
370 219
410 127
440 58
END 143

Listing 4: LIST.SYS

```

0 'DISK MASTER 3
WRITTEN BY MIKE JORGENSEN
COPYRIGHT (C) JANUARY 1991
BY FALSOFT, INC.
10 ' List Master 3
15 ' Coco 3 Utility
20 ' Mike Jorgenson
25 '
30 CLEAR7500:X-32763
35 DIMFL$(78),GR$(78),X$(9)
40 POKE65497,0:D1-PEEK(2394)
45 B1-PEEK(X):F1-PEEK(X+1)
50 FD-PEEK(X+2):B2-PEEK(X+3)
55 F2-PEEK(X+4):TW-PEEK(X+5)
60 F$-STRING$(30,128):G$-STRING$
(32,191):H$-STRING$(32,175):PALE
TTE8,0:PALETTE12,FD:PALETTE13,0:
ON ERR GOT0395:ON BRK GOT0455

```

```

230 POKEX,Y
235 IFQ$="A"THEN150
240 IFQ$="E"THEN300
245 IFQ$="W"THEN315
250 IFQ$-CHR$(8)THENX-X-1
255 IFQ$-CHR$(9)THENX-X+1
260 IFQ$<>CHR$(10)THEN270
265 X-X+32:IFX>1407THENX-X-32
270 IFQ$<>CHR$(94)THEN280
275 X-X-32:IFX<1152THENX-X+32
280 IFX<1152THENX-1407
285 IFX>1407THENX-1152
290 GOTO200
295 PRINT@449."-Abort <E>-Edit <W>-Write Arrows Scroll Through Sector"::GOT0200
300 PRINT@449,F$::PRINT@481." - Abort Edit Mode ..."::PRINT@449."Change CHR$"Y" To What ? " ::LINEINPUTQ$:IFQ$=""THEN295
305 Q-VAL(Q$):IFQ$>255THEN300
310 POKEX,Q:GOT0295
315 PRINT@449,F$::PRINT@481."Write Sector To Disk: <Y/N> ?"::GOSUB400:IFQ$>"Y"THEN295
320 PRINT@481."OK. Writing Sector To Disk ...":
325 Y$=""":FORX-1152T01279
330 Y$-Y$+CHR$(PEEK(K)):NEXT
335 Z$=""":FORX-1280T01407
340 Z$-Z$+CHR$(PEEK(K)):NEXT
345 DSK0$ D1,T,S,Y$.Z$
350 Y$=""":Z$=""":GOT0150
355 DF=0:PRINT@482."Reading Your Disk Directory."::DSK1$ D1,17,2
225,X$,Y$:FORX-3T09:DSK1$ D1,17,X,Y

```

```

RINT"<F2> - Restart Again"
:LOCATE3+C,13:PRINT"<SPACE> - Pause Display":LOCATE3+C,15
150 PRINT"<BREAK> - Abort Routine":LOCATE3+C,19:PRINT"Press Any Key When Ready."::GOSUB480:Q=ASC(Q$):IFQ$=103ORQ-226THEN240
155 GOSUB460:LOCATE0,7
160 X-EOF(1):IFX-1THEN385
165 LINEINPUT#1,X$(1)
170 POKE65497,0:Y-1
175 L-LEN(X$(Y)):IFL<A THEN200
180 Y$-X$(Y):X$(Y)-MID$(Y$,1,B):
Z-Y+1:X$(Z)-MID$(Y$,A,L-B)
185 Y$-X$(Z)
190 IF LEFT$(Y$,1)=" "THENX$(Z)-MID$(Y$.2,LEN(Y$)-1):GOT0185
195 Y-Y+1:GOT0175
200 FORT-1TOY:PRINT" X$(T)
205 NEXT:POKE65496,0
210 Q$=INKEY$:IFQ$=""THEN160
215 PRINT:PRINTSTRING$(C,32)"<F1> <SPACE> <BREAK> <F2>":GOSUB480:IFQ$-CHR$(103)THEN240
220 IFQ$-CHR$(226)THEN240
225 PRINT:IFQ$<>CHR$(4)THEN160
230 PRINTSTRING$(C,32)" Output To Printer: <Y/N> ?"::GOSUB480:IFQ$="Y"THENGOSUB465:GOT0265
235 CLS1:GOSUB465:GOT0155
240 IFP-1THEN255
245 PALETTE0,F2:PALETTE8,B2
250 P-1:GOT0235
255 PALETTE0,B2:PALETTE8,F2
260 P-0:GOT0235
265 GOSUB460:LOCATEC-1,8:LINEINPUT"Chars Per Line 32-95: <ENTER-80> ? ";Q$:W=VAL(Q$)

```

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2 Drive System
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There are a lot of dealers selling disk drives for the CoCo. Why buy from us? First, all our drives are BRAND NEW DOUBLE SIDED Drives. They are sleek, fast (6ms!), quiet and have a reputation of superb performance and reliability. Second, our Drive 0 & 2 Drive Systems come with the acclaimed DISTO Controller - with gold plated contacts & built-in ROM which allows you to access BOTH sides of our drives!. Third, our Drive 0 & 2 Drive Systems come with the Official 200 page Radio Shack Disk Manual. Fourth, you get \$50 worth of our utility software (Disk Util 2.1A & Super Tape/Disk Transfer). Our drive systems are head & shoulders above the rest!

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FD501 Upgrade Kit: Bare Drive, 2 Drive Cable & Instructions: \$109

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DS69B Digitizer: Use your CoCo to display pictures from your VCR. Comes complete with CSEE Software. Only \$149.95. CoCo 2 Version: \$99.95

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- Run your printer at high speed (300-9600)
- Designed by Marty Goodman so you know its quality.
- Unlike other converters, this uses CRYSTAL oscillator which is VERY reliable at higher baud rates and different temperatures.

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Systems w/ Seagate Hard Drive, Controller, Cables, CoCo XT Interface, Cables, Case (with fan, Power Supply and room for second drive), Software & Instruction Manuals. Assembled/Tested/Formatted. Just Plug'N'Run. Req. Multipak.

Seagate 20 Meg System: \$459!
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SALE**

CoCo XT: Use 2 5-120 Meg Drives with your CoCo. Only \$69.95 w/ Real Time Clock: \$99.95

CoCo XT ROM: Boots OS9 from hard/floppy. Only \$19.95

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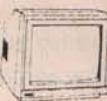
Disk Doctor: Checks/locks out bad sectors. only \$17.95

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MONITORS

MAGNAVOX 1CM135 RGB Monitor

Razor Sharp picture quality for your CoCo! Has 14" Screen, Analog/TTL RGB, Composite & Super VIIS Inputs for CoCo 2/3, Stereo Sound, Text Display Switch, Tilt/Swivel Stand & 2 Year Warranty. Compatible with CoCo, IBM, a VCR & more! Only \$298 (add \$12 S&H/\$40 in Canada)



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Brand new Color Computer 3 with 512K Installed and tested!

Comes with complete manuals and \$100 worth of software!

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```

270 IFW<32 OR W>95THENW=80
275 LX=W+1:LY=INT(W/2)-7
280 LOCATEC-1,10:LINEINPUT"Lines
Per Page 10-85: <ENTER>-52? ":";
Q$:K=0:LP=VAL(Q$)
285 IFLP<10 OR LP>85THENLP=52
290 LOCATEC-1,12:PRINT"Space Bet
ween Paragraphs: <Y/N> ? ":";
295 GOSUB480:IFQ$="Y"THENSP=1
300 PRINTQ$:LOCATEC-1,14:PRINT"P
age Numbering From 2 On: <Y/N>
? ":";GOSUB480:IFQ$="Y"THENPN=1
305 PRINTQ$:LOCATEC+2,18:PRINT"P
rintout Will Pause At The End"
310 LOCATEC+2,19:PRINT"Of Page.
<ENTER> - Continue ";
315 X=EOF(1):IFX=-1THEN380
320 LINEINPUT#1,X$(1)
325 POKE65497,0:Y=1
330 L=LEN(X$(Y)):IFL<LX THEN365
335 Y$=X$(Y):X$(Y)=MID$(Y$,1,W):
Z=Y+1:X$(Z)=MID$(Y$,LX,L-W)
340 XL=W-1:IFMID$(Y$,XL,1)=" "TH
ENX$(Y)=MID$(Y$,1,XL):X$(Z)=MID$(
Y$,W,L-XL)
345 Y$=X$(Z):IFLEN(Y$)<3THENX$(Y
)-X$(Y)+Y$=GOTO365 ELSEIFLEFT$(Y
$,1)<>" "AND MID$(Y$,2,1)=" "THE
NX$(Z)=MID$(Y$,3,LEN(Y$)-2):X$(Y
)-X$(Y)+MID$(Y$,1,1)
350 Y$=X$(Z)
355 IF LEFT$(Y$,1)=" "THENX$(Z)=

```

V

50	203
85	7
145	103
170	114
230	230
305	66
340	73
390	74
425	83
480	95
510	194
END	72

ng Drive :::PRINT@193." <T>=Work Drive Systems Test ";
70 PRINT@257." <V>= View Working
Drive Disk :::PRINT@321." <O>=Quit / Return To Menu ";
75 PRINT@482,"The Working Disk D
rive = "D1;
80 GOSUB540:Q=INSTR("QVTD",Q\$)+1
:ONQ GOTO80,560,480,100
85 PRINT@482,"Which Drive 0-3: <
ENTER> ? ":";GOSUB540
90 D=VAL(Q\$):IFD>3THEN75
95 D1=D:DRIVE D:GOT075
100 PRINT@481,"Insert Formatted
Disk: 'ENTER' :::GOSUB540
105 IFQ\$<>CHR\$(13)THEN100 ELSECL
S:PALETTE12,F1:PALETTE13,B1
110 CLEAR2500,32000
115 DEFUSR0- 54981
120 SR=&HFF49:SS=&HFF48
125 SL=&HFF40:D1=PEEK(2394)
130 DM=0:TX=39:SI=80:SO=112
135 ONERR GOTO465:ONBRK GOT0530
140 IFD1=0THENCP=4:D4=1 ELSEIFD
1=1THENCP=4:D4=2 ELSEIFD1=2THEN
CP=44:D4=4 ELSECP=104:D4=64
145 GOSUB225:CLS:GOSUB525:PRINT@65."<1> - Step Disk Drive In."
150 PRINT" <2> - Step Disk Drive
Out.":PRINT" <3> - Step To Trac
k Number.":PRINT" <4> - Restore
To Track Zero.":PRINT" <5> - Tog
gle Motor ON / OFF."
155 PRINT" <6> - Disk Read & Wri
te Test.":PRINT" <7> - Drive Spe
ed, RPM Test.":PRINT" <8> - Writ
e Protection Test.":PRINT" <9> -
Quit / Return To Menu."
160 PRINT@391,"Enter A Choice ..
":PRINT@449,"TRACK = ZERO
SWITCH =":PRINT@481,"DISK DRIVE
=D1" / MOTOR =";

.".+"MID\$(SB\$,9,3)
420 GR(DF)=GR(DF)+1:Z=ASC(MID\$(X
\$,Y,1)):IFZ<78THENY=Z+1:GOT0420
425 RETURN
430 IFDF<1THENPRINT@482."NO FILE
S IN DISK'S DIRECTORY";:SOUND5,7
:FORX=1TO1500:NEXT:GOT075
435 K=1:F=FREE(D1):PALETTE12,F1:
PALETTE13,B1:CLS:PRINT@5."<<< Di
rectory Of "D1">>>":PRINT
440 FORX=1TO DF:IFGR(X)<10THENFL
\$(X)=FL\$(X)+" "+STR\$(GR(X))ELSEF
L\$(X)=FL\$(X)+STR\$(GR(X))
445 IFK=1THENK=0:PRINTFL\$(X)":NEXT
450 PRINT"Free - "F:PRINT:Q\$=INKE
Y\$:PRINT@482."Press Any Key When
Ready ..."::GOSUB480:RUN
455 CLOSE:IF LC=1THENPOKE359,57:
POKE65314,21:RUN ELSERUN
460 CLS:LOCATE6+C,1:PRINT"<<< LI
ST MASTER 3 >>>":RETURN
465 CLOSE:OPEN"I".#1,A\$:RETURN
470 SOUND5,7:FORX=1TO1650
475 NEXT:RETURN
480 Q\$=INKEY\$:IFQ\$=""THEN480
485 RETURN
490 PRINT@482,"Insert System Dis
k & 'ENTER' :::GOSUB480
495 IFQ\$<>CHR\$(13)THEN490
500 LOAD"BOOT",R

Listing 5: TEST.SYS

```

0 *DISK MASTER 3
    WRITTEN BY MIKE JORGENSEN
    COPYRIGHT (C) JANUARY 1991
    BY FALSOFT, INC.
10 * Test Master 3
15 * Coco 3 Utility
20 * Mike Jorgenson
25 *
30 CLEAR5000:POKE65497,0
35 DIMFL$ (78),GR(78):X=32763
40 D1=PEEK(2394):B1=PEEK(X)
45 F1=PEEK(X+1):FD=PEEK(X+2)
50 F$=STRING$(30,128):G$=STRING$(
32,191):H$=STRING$(32,175):PALE
TTE8,0:PALETTE12,FD:PALETTE13,0:
ON ERR GOTO470:ON BRK GOT0530
55 CLS:PRINT@0,G$:PRINT@32,G$:GO
SUB525:PRINT@416,G$
60 FORX=96TO352 STEP32:PRINT@X,H
$:NEXT:POKE65496,0
65 PRINT@129." <D>= Change Worki

```

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Fully assembled and TESTED. Our design allows a firm contact and mounting chips on top to prevent any heating problems. Fast 120ns chips. No soldering; Easy picture instructions for 2 minute installation! Comes with following software (value \$100):

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1 MEG UPGRADE

- Upgrade your CoCo 3 to 1 MEG!
- Kit includes 512K Memory and necessary Hardware
- Includes OS9 Drivers by Kevin Darling
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Get 92K from your 128K CoCo 3 and 476K on 512K for Basic Program and variables!! Only \$39.95
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EPROM

INTRONICS EPROM PROGRAMMER: Programs 2516, 27xx/xxx series and more! Includes software & complete documentation. Latest version. CoCo 1,2,3. Only **\$137.95**

DATARASE EPROM ERASER: For 24/28 pin Eproms. Erases up to 4 EPROMs at a time. Only **\$49.95**

Both Eprom Programmer & Eraser: \$179.95

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6 Feet Keyboard Extension Cable. Have up to 2 keyboards hooked up to your CoCo. Only \$39.95

CoCo 3 Keyboard: \$39.95 w/ Extension Cable: \$69.95

CoCo 2 Keyboard: \$19.95 w/ Extension Cable: \$49.95

(CoCo 3 Keyboard includes free Function Keys Software)

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Magnavox 8505/8515/8CM643 RGB Cable: \$24.95

Magnavox 1CM135 RGB Cable: \$24.95

Serial-to-Parallel Interface: Use your parallel printer at high speed (300-9600 baud) with CoCo. Comes with all cables. Only \$44.95

15" Shielded Multipak Extension Cable: \$36.95

Y Cable: Use your disk system with Speech/RS232 Pack, DS69 Digitizer, etc. Only \$27.95

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CHIPS, ETC...

Genuine RS Disk ROM 2.1 (Needed for CoCo 3): \$29.95

68B09E Chip: \$14.95 68B21 Chip: \$5.95

GIME Chip for CoCo 3: \$39.95

Genuine RS Multipak PAL Chip w/ complete instructions (Specify 26-3024/3124): \$19.95

PAL Switcher: Allows you to switch between CoCo 2 & 3 modes when using the Multipak. You need the OLDER & NEW PAL Chip for the 26-3024 Multipak. Only \$39.95. With NEW PAL Chip Only \$49.95



```

UB540:IFQ$<>"Y"THEN TX-34
330 PRINT@389," Writing To Disk
...":IF PEEK(2439)=255THEN VF-1
335 VERIFY OFF:FORX=0 TO TX:PRINT
@457,X,:FOR Y=1 TO 18:DSK0$ D1,X,Y,
X$,X$:NEXT Y,X
340 PRINT@391,"Read & Verifying .
..":FOR X=0 TO TX:PRINT@457,X,:FOR
Y=1 TO 18:DSK1$ D1,X,Y,Y$,Z$:IFY$-
X$ AND Z$=X$THEN NEXT Y,X ELSE 355
345 PRINT@391,"Verify Complete .
..":SOUND100,6:GOSUB550
350 GOSUB535:GOT0110
355 GOSUB550:GOT0465
360 POKE SL,D4:PRINT@388,"Drive
Light On: <Y/N> ?"
365 GOSUB540:IFQ$="N"THEN465
370 X-USR0():PRINT@387,"Does Sy
stem Work: <Y/N> ?"
375 PRINT@449,"Slide Disk In And
Out Of Drive";
380 PK=PEEK(SS)
385 WP=PK AND 64:IF WP<1 THEN PR
INT@481," WRITE PROTECT IS NOT EN
ABLED ";ELSE PRINT@481," THE WRIT
E PROTECT IS ENABLED ";
390 Q$=INKEY$:IFQ$="N"THEN380
395 IFQ$="N"THEN465
400 POKE SL,0:GOT0110
405 GOSUB540:GOT0400
410 PRINT@389,"Custom Basic: <Y
/N> ?":GOSUB540:GOSUB280:IFQ$="Y
"THEN L=5347 ELSE L=5440
415 FORX=32001 TO 32036:READ D:PO

```

<input checked="" type="checkbox"/>
25.....142
55.....137
85.....149
110.....248
140.....57
END.....67

Listing 6: TRAK.SYS

```

0 'DISK MASTER 3
WRITTEN BY MIKE JORGENSEN
COPYRIGHT (C) JANUARY 1991
BY FALSOFT, INC.
10 ' Track Master 3
15 CLEAR23275:POKE65497,0
20 X=32763:B1=PEEK(X):F1=PEEK(X+
1):K=PEEK(X+2):IP=PEEK(2394):DIM
Y$(5,18),Z$(5,18),FL$(78):FS=STR
ING$(30,128):G$=STRING$(32,191):
ONBRK GOTO15:ONERR GOTO115
25 PALETTE12,K:PALETTE13,0:CLS:P
RINTG$:PRINT@32,G$:PRINT@4," <<
TRACK MASTER 3 >> ":"FORX=96TO
352 STEP32:PRINT@X,STRING$(32,17
5):NEXT:PRINT@416,G$;
30 PRINT@129," <D>- Change Worki
ng Drive ":"PRINT@193," <B>-
Backup The Working Disk ":"PRINT
@257," <V>- View Working Drive D
isk ":"PRINT@321," <Q>- Quit / R
eturn To Menu ":";
35 POKE65496,0:PRINT@481," The W
orking Disk Drive = "IP:
40 GOSUB175:Q$=INSTR("BVQD",Q$)+1
:ONQ GOTO40,55,120,185

```

```

KEK,D:NEXT:Y=K:Z=Y+1:X=0:T=0:PRI
NT@389," Drive RPM =":POKE235,
D1:EXEC32001:FORK=1TO43:NEXT
420 EXEC32001:P=PEEK(Y)*256+PEEK
(Z):IFP=0THEN465 ELSE S=(L/P)*300
:T=T+S:X=X+1:PRINT@405,USING"###
##";S:IF INKEY$=""THEN420
425 POKE SL,0:AV=T/X:PRINT@391,"
AVG Speed =":PRINT@405,USING"#
##";AV=GOSUB535:GOT0110
430 IF K=0THEN K=1:PRINT@406,"
":ELSE K=0:PRINT@406,"...":
435 FORX=1TO50:NEXT:GOT0195
440 DATA 52,18,142,0,0,182,255
445 DATA 72,48,1,39,18,132,2,38
450 DATA 245,142,0,0,182,255,72
455 DATA 48,1,39,4,132,2,39,245
460 DATA 175,141,0,2,53,146
465 PRINT@449,"DRIVE FUNCTION ER
ROR DETECTED. Press Any <KEY> W
hen Ready ...":POKE &HFF40,0:SO
UND5,7:GOSUB540:GOT0110
470 PRINT@481,"System Function E
rror Detected":SOUND5,7
475 FORX=1TO1650:NEXT:RUN
480 DF=0:PRINT@482,"Reading Your
Disk Directory.":DSKI$ D1,17,2
,X$,Y$:FORX=3T09:DSKI$ D1,17,X,Y
,Z$:FORK=1TO128 STEP32:GOSUB485
:NEXTK:Y$=Z$:FORK=1TO128 STEP32:
GOSUB485:NEXTK,X:GOT0500
485 SB$=MID$(Y$,K,14):L$=LEFT$(S
B$,1):IF ASC(SB$)>127 OR L$=CHR$(
0)THENRETURN ELSE IFL$=CHR$(255)
500 ELSEDF=DF+1:Y=ASC(RIGHT$(S
B$,1))+1:FL$(DF)=LEFT$(SB$,8)+
"."+MID$(SB$,9,3)
505 GR(DF)=GR(DF)+1:Z=ASC(MID$(X
,$,Y,1)):IFZ<78THENY=Z+1:GOT0490
510 RETURN
515 IFDF<1THENPRINT@482,"NO FILE
S IN DISK'S DIRECTORY":SOUND5,7
:FORX=1TO1500:NEXT:GOT065
520 K=1:F=FREE(D1):PALETTE12,F1:
PALETTE13,B1:CLS:PRINT@5,"<< Di
rectory of" D1 ">>":PRINT
525 FORX=1TO1850:NEXT:TESTMASTER3
:>> ":"RETURN
530 POKE &HFF40,0:RUN
535 FORX=1TO1850:NEXT:RETURN
540 Q$=INKEY$:IFQ$="N"THEN540
545 RETURN
550 IFVF=1THEN VERIFYON
555 RETURN
560 PRINT@482,"Insert System Dis
k & 'ENTER'":GOSUB540
565 IFQ$<>CHR$(13)THEN560
570 CLEAR200,32762
575 ON ERR GOT0470
580 LOAD"BOOT",R

```

```

45 PRINT@482,"Which Drive 0/3: <
ENTER-> ?":GOSUB175:D=VAL(Q$):
IFD<4THENIP=D:DRIVED
50 GOT035
55 PRINT@130,"The Source Disk Dr
ive is: "IP:"PRINT@194,"Destinat
ion 0/3: <ENTER-> ?":PRINT@257
,F$::PRINT@321,F$::PRINT@481,"<B
REAK> - Abort Backup Routine":G
OSUB175:OP=VAL(O$):IFOP>3THEN30
60 PRINT@194,"The Destin Disk Dr
ive is: "OP:"PRINT@258,"Tracks:
<F1=35> <F2=40> ?":TK=35:GOS
UB175:IFQ$=CHR$(4)THENTK=40
65 PRINT@322,"Bypass Disk Errors
: <Y/N> ?":GOSUB175:ONERR GOTO
105:G$="":X=1:IFQ$="N"THENBY=1
70 PRINT@258,"Reading: 0 "TK"Tr
ack Backup":PRINT@322,"Errors:
Read = 0 Write = 0":PRINT@481
,F$::ER=0:EW=0:T=1:GOT085
75 T=1:IFIP=OP THENQ$="Source":G
OSUB165
80 PRINT@258,"Read":
85 PRINT@266,TN:POKE65496,0:FOR
S=X TO18:DSKI$ IP,TN,S,Y$(T,S),Z
$(T,S):NEXT:POKE65497,0:TN=TN+1:
T=T+1:X=1:IFT<6THEN85 ELSE T=1:IF
IP=OP THENQ$="Destin":GOSUB165
90 TN-TN-5:PRINT@258,"Writ":
95 PRINT@266,TN:POKE65496,0:FOR
S=X TO18:DSK0$ OP,TN,S,Y$(T,S),Z
$(T,S):NEXT:POKE65497,0:TN=TN+1:
T=T+1:X=1:IFT<6THEN95 ELSEFOR Y=1
TO5:FORZ=1TO18:Y$(Y,Z)=""":Z$(Y,Z
)-"":NEXTZ,Y:IFTN>TK THEN75
100 PRINT@481,"Run Same Config A
gain: <Y/N> ?":SOUND5,7:GOSUB17
5:IFQ$="Y"THENPRINT@481,"Insert
Subject Disks & 'ENTER'":GOSUB1
105 TN=0:GOT070 ELSE RUN
110 X=S+1:IF ERLIN=85THENER=ER+1
:PRINT@337,ER::GOT085 ELSEIF ERL
IN=95THENNEW=EW+1:PRINT@348,EW::G
OT095
115 PRINT@481,"System Function E
rror Detected":SOUND5,7:FORX=1T
O1650:NEXT:RUN
120 PRINT@482,"Reading Your Disk
Directory.":FL=0:FORX=3T09:DSK
I$ IP,17,X,A$,B$:GOSUB125:A$=B$:
GOSUB125:NEXTX:GOT0135
125 FORK=1TO128 STEP32:FL=FL+1:F
L$(FL)=MID$(A$,K,11):A$=ASC(LEFT$(
FL$(FL),1)):IFA=0THENFL=FL-1 EL
SEIFA=255THENFL=FL-1:GOT0135
130 NEXTK:RETURN
135 IFFL<1THENPRINT@482,"NO FILE
S IN DISK'S DIRECTORY":SOUND5,7
:FORX=1TO1500:NEXT:RUN
140 FORX=1TOFL:FL$(X)=LEFT$(FL$(X
),8)":+"+MID$(FL$(X),9,3):NEXT
145 PALETTE12,F1:PALETTE13,B1:CL
S:PRINT@5,"<< Directory of" IP
">>":PRINT:X=1:FORK=1TOFL
150 IFX=1THENX=0:PRINT" FL$(K)
":ELSE X=1:PRINTFL$(K)
155 NEXT:PRINT:Q$=INKEY$
160 PRINT@482,"Press Any Key Whe
n Ready ...":GOSUB175:RUN
165 PRINT@482,"Insert "Q$" Disk
& 'ENTER'":SOUND5,7
170 GOSUB175:IFQ$=CHR$(13)THENPR
INT@481,F$::RETURN ELSE IFL$=0
175 Q$=INKEY$:IFQ$="N"THEN175
180 RETURN
185 Q$="System":GOSUB165
190 LOAD"BOOT",R

```

40	..... Ø
65	..... 217
85	..... 194
115	..... 160
150	..... 193
175	..... 251
END	..... 203

Listing 7: COPY.SYS

```

0 ' DISK MASTER 3
  WRITTEN BY MIKE JORGENSEN
  COPYRIGHT (C) JANUARY 1991
  BY FALSOFT, INC.
10 ' Copy Master 3
15 ' Coco 3 Utility
20 ' Mike Jorgenson
25 '
30 CLEAR1500:POKE65497,0
35 DIM FL$(78).GR(78):D1=PEEK(23
94):X=32763:B1=PEEK(X):F1=PEEK(X
+1):Q=PEEK(X+2):F$=STRING$(30,12
8):G$=STRING$(32,191):HS=STRING$
(32,175):ONBRK GOTO30:ONERR GOTO
200:PALETTE12,Q:PALETTE13,0
40 CLS:PRINT@0,G$:PRINT@32,G$:PR
INT@4." <<< COPY MASTER 3 >>> ";
:PRINT@416,G$:FORX=96T0352 STEP3

```

```

2:PRINT@X,H$:NEXT:POKE65496,0
45 PRINT@129,"<D>- Change Worki
ng Drive ":";PRINT@193,"<C>-
Copy Working Disk Files ":";PRINT
@257,"<V>- View The Disk Direct
ory ":";PRINT@321,"<Q>- Quit / R
eturn To Menu ":";PRINT@482,"Th
e Working Disk Drive = "D1;
50 GOSUB215:Q=INSTR("QVCD",Q$)+1
:ONQ GOTO50,225,150,65
55 PRINT@482,"Which Drive 0-3: <
ENTER-> ? ":";GOSUB215:D=VAL(Q$)
:IFD<4THEND1=D:DRIVED
60 GOT045
65 PRINT@129,"<1>- Copy a Singl
e Disk File ":";PRINT@193,"<2>-
Supercopy Several Files ":";PRINT
@257,"<3>- Supercopy All The Fi
les ":";PRINT@321,"<BREAK> - Abo
rt Copy Routine ";
70 PRINT@482,"Enter Your Choice
When Ready ":";GOSUB215:Q=VAL(Q$):
IFQ<1 OR Q>3THEN45
75 IFQ=1THENPRINT@129," Copying
a Single Disk File ":";ELSEIFQ=2
THENPRINT@129," Supercopy Severa
l Disk Files ":";ELSEPRINT@129," S
upercopy All The Disk Files ";
80 PRINT@193." The Source Disk D
rive Is: "D1:;PRINT@257," Enter
Destin Drive: <0/3> ? ":";PRINT@321,F$::PRINT@482,"<BREAK> - Abo
rt Copy Routine";
85 GOSUB215:D2=VAL(Q$):IFD2>3THE
N45 ELSEPRINT@257," The Destin D
isk Drive Is: "D2;
90 D$=0:IFD2<1THEND$="Ø"
95 IFQ>1THEN100 ELSEPRINT@482,"E
nter a Filename / Extension ":";PR
INT@322,"<LINEINPUTFL$(1):PRIN
T@351,CHR$(175):L=LEN(FL$(1)):I
FL<3 OR L>12THEN40 ELSE105
100 GOSUB170:K=Ø:IFDF>1THEN115
105 IFD2>D1 THENPRINT@481,F$::P
RINT@482,"COPYING: "FL$(1)" To
"D2::COPY""+FL$(1)TO""+FL$(1)+"":
"+D$:RUN
110 CLS:COPY""+FL$(1):SOUND100,6
:CLS:LINEINPUT" Insert Source Di
sk & 'ENTER' ";Q$:RUN
115 IFQ=3THEN125 ELSEPRINT@322,"
<F1> - And Copy All The Rest";:F
ORX=1TO DF:PRINT@482,"COPY: "FL
$(X)" <Y/N> ?";
120 Q$=INKEY$:IFQ$="Y"THENNEXT E
LSEIFQ$="N"THENFL$(X)="":NEXT EL
SEIFQ$<>CHR$(226)THEN120
125 IFD1=D2 THEN140 ELSEFORX=1TO
DF:IFFL$(X)<>"THENK=1:PRINT@48
2,"COPYING: "FL$(X)" To"D2::CO
PY""+FL$(X)TO""+FL$(X)+"":"+D$:
130 NEXT:IFK=1THEN SOUND100,6
135 RUN
140 FORX=1TO DF:IFFL$(X)<>"THEN
CLS:COPY""+FL$(X):SOUND100,6:CLS
:LINEINPUT" Insert Source Disk &
'ENTER' ";Q$:
145 NEXT:RUN

```

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```

150 GOSUB170:K=1:F=FREE(D1):PALE
TTE12,F1:PALETTE13,B1:CLS:PRINT@5,"<<< Directory Of "D1">>>""
155 PRINT:FORX=1TO DF:IFGR(X)<10
THENFL$(X)=FL$(X)+" "+STR$(GR(X))
)ELSEFL$(X)=FL$(X)+STR$(GR(X))
160 IFK=1THENK=0:PRINTFL$(X)" ";
:NEXT ELSEK=1:PRINTFL$(X):NEXT
165 PRINT"Free -"F:PRINT:Q$=INKE
Y$:PRINT@482."Press Any Key When
Ready ...":GOSUB215:RUN
170 DF=0:PRINT@482."Reading Your
Disk Directory.":DSKI$ D1,17,2
,X$,Y$:FORX=3TO9:DSKI$ D1,17,X,Y
,Z$:FORK=1TO128 STEP32:GOSUB175
:NEXTK:Y$=Z$:FORK=1TO128 STEP32:
GOSUB175:NEXTK,X:GOTO190
175 SB$=MID$(Y$,K,14):L$=LEFT$(S
B$,1):IF ASC(SB$)>127 OR L$=CHR$(
0)THENRETURN ELSEIFL$=CHR$(255)
THEN190 ELSEDF=DF+1:Y=ASC(RIGHT$(
SB$,1))+1:FL$(DF)=LEFT$(SB$,8)+"
."+MID$(SB$,9,3)
180 GR(DF)=GR(DF)+1:Z=ASC(MID$(X
,$Y,1)):IFZ<78THENY=Z+1:GOTO180
185 RETURN
190 IFDF<1THENPRINT@482."NO FILE
S IN DISK'S DIRECTORY"::SOUND5,7
:FORX=1TO1500:NEXT:GOT045
195 RETURN
200 IF ERNO>26THENPRINT@482,"Fil
e Not In Disk's Directory"; ELSE
PRINT@481."System Function Error
Detected";
205 SOUND5,7:FORX=1TO1650
210 NEXT:RUN
215 Q$=INKEY$:IFQ$=""THEN215
220 RETURN
225 PRINT@482."Insert System Dis
k & 'ENTER'"::GOSUB215
230 IFQ$<>CHR$(13)THEN225
235 LOAD"BOOT",R

```

<input checked="" type="checkbox"/>	55	219
	95	243
	120	157
	150	169
	190	163
	220	251
	END	22

Listing 8: KILL.SYS

```

0 'DISK MASTER 3
    WRITTEN BY MIKE JORGENSEN
    COPYRIGHT (C) JANUARY 1991
    BY FALSOFT, INC.
10 ' Kill Master 3
15 ' Coco 3 Utility
20 ' Mike Jorgenson
25 '
30 CLEAR5000
35 DIM FL$(78),GR(78)
40 POKE65497,0:X=32763
45 D1=PEEK(2394):B1=PEEK(X)
50 F1=PEEK(X+1):FD=PEEK(X+2)
55 F$=STRING$(30,128):G$=STRING$(
32,191):H$=STRING$(32,175):ON B
RK GOTO30:ON ERR GOTO245
60 PALETTE12,FD:PALETTE13,0
65 CLS:PRINT@0,G$:PRINT@32,G$
70 PRINT@4." <<< KILL MASTER 3 >
>> ":";PRINT@416,G$
75 FORX=96TO352 STEP32
80 PRINT@X,H$:NEXT:POKE65496,0
85 PRINT@129." <D>- Change Worki
ng Drive ":";PRINT@193." <K>-
Kill Working Disk Files ":";PRINT
@257." <V>- View The Disk Direct
ory ":";PRINT@321." <Q>- Quit / R
eturn To Menu ":";GOSUB240
90 GOSUB270:Q=INSTR("QVKD",Q$)+1
:ONQ GOTO90,280,195,105
95 PRINT@482."Which Drive 0-3: <
ENTER-> ? ":";GOSUB270:D=VAL(Q$)
:IFD<4THEND1=D:DRIVE D
100 GOSUB240:GOTO90
105 PRINT@129." <1>- Kill a Sing
le Disk File ":";PRINT@193." <2>-
Superkill Several Files ":";PRIN
T@257." <3>- Superkill All The F
iles ":";PRINT@321." <BREAK> - Ab
ort Kill Routine ";
110 PRINT@482."Enter Your Choice
When Ready ":";GOSUB270:Q=VAL(Q$)
:IFQ<1 OR Q>3THEN85
115 IFQ<>1THEN195 ELSEPRINT@130,

```

```

"Killing A Single Disk File ";
120 PRINT@194."Enter a Filename
/ Extension":;PRINT@257,F$::GOSU
B240:PRINT@258."":;LINEINPUTFL$(1):
PRINT@287,CHR$(175)::L=LEN(FL
$(1)):IFL<3 OR L>12THEN75
125 PRINT@481,F$::PRINT@482."KIL
LING: "FL$(1)" On"D1::KILL""+F
L$(1):RUN
130 PRINT@130."The Working Disk
Drive = "D1::IFQ=2THENPRINT@194
."Superkill Several Disk Files";
ELSEPRINT@194."Superkill All Th
e Disk Files":;GOT0145
135 PRINT@258."<F1> - And Kill A
11 The Rest":;FORX=1TO DF:PRINT@
482."KILL: "FL$(X)" <Y/N> ?";
140 Q$=INKEY$:IFQ$="Y"THENNEXT E
LSEIFQ$="N"THENFL$(X)="":NEXT EL
SEIFQ$<>CHR$(226)THEN140
145 PRINT@257,F$::PRINT@481,F$;
150 PRINT@322."Want To Reconside
r: <Y/N> ?":;GOSUB270
155 K=0:IFQ$<>"N"THEN85
160 FORX=1TO DF:IFFL$(X)=""THENN
EXT ELSEK=1:PRINT@481,F$::PRINT@
482."KILLING: "FL$(X)" On"D1:::
KILL""+FL$(X):NEXT
165 IFK=1THEN SOUND100,6
170 RUN
175 K=1:F=FREE(D1):CLS:PALETTE12
,F1:PALETTE13,B1:PRINT@5."<<< Di
rectory Of "D1">>>":PRINT
180 FORX=1TO DF:IFGR(X)<10THENFL
$(X)=FL$(X)+" "+STR$(GR(X))ELSEF
L$(X)=FL$(X)+STR$(GR(X))
185 IFK=1THENK=0:PRINTFL$(X):NEXT
190 PRINT"Free -"F:PRINT:Q$=INKE
Y$:PRINT@482."Press Any Key When
Ready ...":;GOSUB270:RUN
195 DF=0:PRINT@482."Reading Your
Disk Directory.":;
200 DSKI$ D1,17,2,X$,Y$
205 FORX=3TO9:DSKI$ D1,17,X,Y$,Z
$:FORX=1TO128 STEP32:GOSUB210:NE
XTK:Y$=Z$:FORK=1TO128 STEP32:GOS
UB210:NEXTK,X:GOTO225
210 SB$=MID$(Y$,K,14):L$=LEFT$(S
B$,1):IF ASC(SB$)>127 OR L$=CHR$(
0)THENRETURN ELSEIFL$=CHR$(255)
THEN225 ELSEDF=DF+1:Y=ASC(RIGHT$(
SB$,1))+1:FL$(DF)=LEFT$(SB$,8)+"
."+MID$(SB$,9,3)
215 GR(DF)=GR(DF)+1:Z=ASC(MID$(X
,$Y,1)):IFZ<78THENY=Z+1:GOTO215
220 RETURN
225 IFDF<1THENPRINT@482."NO FILE
S IN DISK'S DIRECTORY":;SOUND5,7
:FORX=1TO1500:NEXT:GOT045
195 RETURN
200 IF ERNO>26THENPRINT@482,"Fil
e Not In Disk's Directory"; ELSE
PRINT@481."System Function Error
Detected";
205 SOUND5,7:FORX=1TO1650
210 NEXT:RUN
215 Q$=INKEY$:IFQ$=""THEN215
220 RETURN
225 PRINT@482."Insert System Dis
k & 'ENTER'":;GOSUB215
230 IFQ$<>CHR$(13)THEN225
235 LOAD"BOOT",R

```

<input checked="" type="checkbox"/>	60	206
	95	226
	140	112
	190	127
	215	228
	255	244
	END	178

Listing 9: SORT.SYS

```

0 'DISK MASTER 3
    WRITTEN BY MIKE JORGENSEN
    COPYRIGHT (C) JANUARY 1991
    BY FALSOFT, INC.
10 ' Sort Master 3
15 ' Coco 3 Utility
20 ' Mike Jorgenson
25 '
30 CLEAR10000:POKE65497,0
35 DIMFL$(78),GR(78):X=32763
40 D1=PEEK(2394):B1=PEEK(X)
45 F1=PEEK(X+1):FD=PEEK(X+2)
50 ON BRK GOTO30:ON ERR GOTO285
55 F$=STRING$(30,128):G$=STRING$(
32,191):H$=STRING$(32,175)
60 PALETTE12,FD:PALETTE13,0:CLS:
PRINT@0,G$:PRINT@32,G$:PRINT@4,
" <<< SORT MASTER 3 >>> ":";FORX=96
TO352 STEP32

```

```

6T0352 STEP32:PRINT@X,H$:NEXT:PR
INT@416,G$:POKE65496,0
65 PRINT@129." <D>- Change Worki
ng Drive ":";PRINT@193," <S>-
Sort The Disk Directory ":";PRINT
@257." <V>- View The Disk Direct
ory ":";PRINT@321," <Q>- Quit / R
eturn To Menu ";
70 PRINT@482."The Working Disk D
rive = "D1;
75 GOSUB275:Q=INSTR("QVSD",Q$)+1
:ONQ GOT075.295.210.95
80 PRINT@482."Which Drive 0-3: <
ENTER-> ? ":";GOSUB275
85 D=VAL(Q$):IFD>3THEN70
90 D1=D:DRIVE D:GOT070
95 PRINT@129." <1>- Sort Disk By
Filename ":";PRINT@193," <2>-
Sort Disk By Extension ":";PRINT
@257." <3>- Sort Disk By File Ty
pe ":";PRINT@321," <BREAK> - A
bort Disk Sort ";
100 PRINT@482."Enter Your Choice
When Ready";;GOSUB275
105 Q=VAL(Q$):IFQ<1 ORQ>3THEN65
110 GOSUB255:FL=0:FORX=3TO9:DSKI
$ D1,17,X,Y,Z:GOSUB115:Y$=Z$:G
OSUB115:NEXTX:GOT0125
115 FORX=1TO128 STEP32:FL=FL+1:F
L$(FL)=MID$(Y$,K,32):A=ASC(LEFT$(
FL$(FL),1)):IFA=0THENFL=FL-1 EL
SEIFA=255THENFL=FL-1:GOT0125
120 NEXTK:RETURN
125 IFFL<1THEN260
130 IFFL=1THEN270
135 POKE65497,0:PRINT@482,"Sorti
ng Your Disk Directory. ";
140 ON Q GOT0145,160.175
145 K=0:FORX=1TO FL:Y=X+1
150 IF LEFT$(FL$(X),11)>LEFT$(FL
$(Y),11)THENZ=1:K=1:X$=FL$(X):FL
$(X)=FL$(Y):FL$(Y)=X$
155 NEXT:IFK=1THEN145 ELSE190
160 K=0:FORX=1TO FL:Y=X+1
165 IF MID$(FL$(X),9,3)>MID$(FL
$(Y),9,3)THENZ=1:K=1:X$=FL$(X):FL
$(X)=FL$(Y):FL$(Y)=X$
170 NEXT:IFK=1THEN160 ELSE190
175 K=0:FORX=1TO FL:Y=X+1
180 IF MID$(FL$(X),12,1)>MID$(FL
$(Y),12,1)THENZ=1:K=1:X$=FL$(X):
FL$(X)=FL$(Y):FL$(Y)=X$
185 NEXT:IFK=1THEN175
190 POKE65496,0:IFFL<>1THEN270
195 SC=3:X=0:PRINT@482."Writing
Your Disk Directory. ";
200 Y$=""Z$=""FORK=1TO4:GOSUB2
05:Y$=Y$+FL$(X+K):NEXT:FORK=5TO8
:GOSUB205:Z$=Z$+FL$(X+K):NEXT:DS
K0$ D1,17,SC,Y$,Z$:SC=SC+1:X=X+8
:IFX<FL THEN200 ELSERUN
205 IFFL$(X+K)=""THENFL$(X+K)=ST
RING$(32,255):RETURN ELSERETURN
210 GOSUB255:DF=0:DSKI$ D1,17,2,
X$,Y$:FORX=3TO9:DSKI$ D1,17,X,Y$:
Z$:FORK=1TO128 STEP32:GOSUB215:
NEXTK:Y$=Z$:FORK=1TO128 STEP32:G
OSUB215:NEXTX,X:GOT0230
215 SB$=MID$(Y$,K,14):L$=LEFT$(S
B$,1):IF ASC(SB$)>127 OR L$=CHR$(
0)THENRETURN ELSEIFL$=CHR$(255)
THEN230 ELSEDF=DF+1:Y=ASC(RIGHT$(
SB$,1))+1:FL$(DF)=LEFT$(SB$,8)+"
":+MID$(SB$,9,3)
220 GR(DF)=GR(DF)+1:Z=ASC(MID$(X
$,Y,1)):IFZ<78THENY=Z+1:GOT0220
225 RETURN
230 IFDF<1THEN260
235 K=1:F=FREE(D1):PALETTE12,F1:
PALETTE13,B1:CLS:PRINT@5,"<<< Di
rectory Of"D1">>>":PRINT
240 FORX=1TO DF:IFGR(X)<10THENFL
$(X)=FL$(X)+" "+STR$(GR(X))ELSEF
L$(X)=FL$(X)+STR$(GR(X))
245 IFK=1THENK=0:PRINTFL$(X)" ";
:NEXT ELSEK=1:PRINTFL$(X):NEXT
250 PRINT"Free ="F:PRINT:Q$=INKE
Y$:PRINT@482."Press Any Key When
Ready ...";;GOSUB275:RUN
255 PRINT@482."Reading Your Disk
Directory. ";:RETURN
260 PRINT@482."NO FILES IN DISK"
S DIRECTORY";:SOUND5.7
265 FORX=1TO150:NEXT:GOT065
270 PRINT@482."DISK HAS ALREADY
BEEN SORTED";:SOUND5.7:GOT0290
275 Q$=INKEY$:IFQ$=""THEN275
280 RETURN
285 PRINT@481."System Function E
rror Detected";:SOUND5.7
290 FORX=1TO1650:NEXT:RUN
295 PRINT@482."Insert System Dis
k & 'ENTER"';;GOSUB275
300 IFQ$<>CHR$(13)THEN295
305 LOAD"BOOT".R

```

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Border Color Change

by Andrew Bartels

Here is a simple utility that allows you to greatly enhance your CoCo 3 screen displays. With the purchase of your CoCo 3, you were amazed at all the wonderful foreground and background color combinations that are available. Now you can control the border color, too!

Border works on 40- and 80-column text screens. To use the program, enter the listing and run it. The screen automatically changes to the 40-column text screen and the border changes to black. It is very easy to change the border. Determine the number of your favorite border color (0 to 63) and poke that value into address 32720. The border color changes instantly.

If you use this program often, you can save yourself the trouble of entering `POKE 32720,x` every time you run the program. The first number in Line 12 (0) is the default border color. By converting the color number to hexadecimal and substituting it for this number, you can have your favorite border color shown upon initialization.

There are three main parts to the machine-language portion of this utility.

The first portion, INIT in lines 150 through 190, initializes the routine that changes the border color. It trades the interrupt vector at \$010D with the address of the BORDER routine. The original address in \$010D is stored at the label JUMP and INIT returns to BASIC.

The second portion, BORDER in lines 230 through 270, is executed once every time an interrupt occurs, which is usually 60 times per second. When executed, this routine saves Register A on the stack and loads it with the color value stored at address 32720. This value is placed in the Border register of the GIME chip (\$FF9A). Finally, Register A is restored from the stack and the routine jumps to the original interrupt vector. Thus, while BORDER is executed upon any interrupt, other interrupt functions can take place as they would normally occur.

Address \$FF9A contains the border color displayed by the CoCo 3. To change the border color in a BASIC program, this utility can be used but is not needed. Simply poke the appropriate color value into \$FF9A to achieve the desired effect. When in direct mode, the border color

will not remain constant unless you regularly store the appropriate color value into \$FF9A. But *Border* allows the border color change while in direct mode.

The third portion, DONE in lines 200 through 220, is a short routine that takes the original interrupt address located at JUMP and places it back into \$010D. Thus, when an interrupt occurs, the CoCo 3 jumps directly to its interrupt service routine and skips the BORDER routine. If for some reason you need to disable the border color change, you can EXEC &H7FDE (the address of the DONE routine). To enable it again, EXEC &H7FD1 (the address of the INIT routine).

Warning! Do not attempt to execute INIT two times consecutively. Doing so will crash your CoCo! Make sure you end the INIT routine with DONE prior to starting INIT.

I hope this routine enhances your CoCo 3 screen displays. You may want to note that *Border* can be used to change the border colors in any of the HSCREEN modes, too. Enjoy!

Listing 1: BORDER

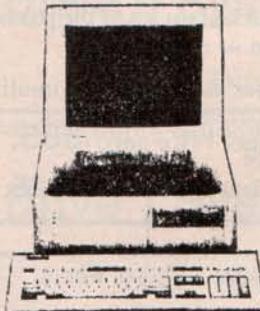
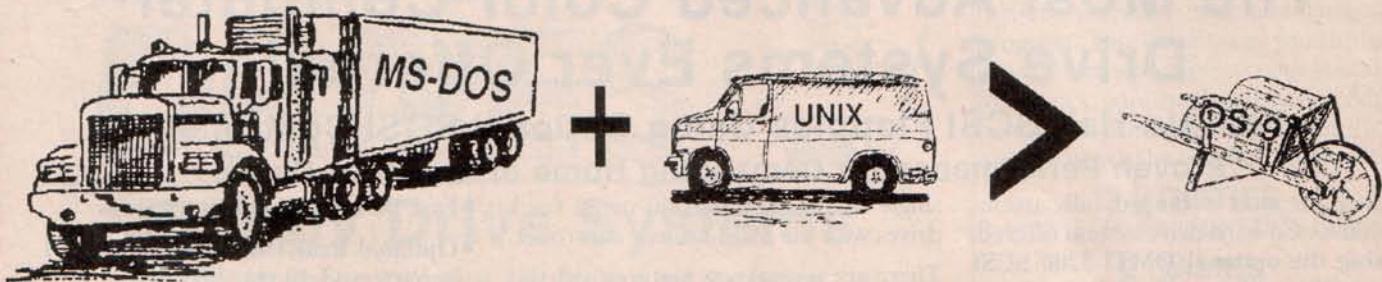
```
0 *****  
  *COPYRIGHT 1990 FALSOFT INC*  
1  *  BORDER COLOR CHANGE  *  
2  *    FOR COCO III      *  
3  *    BY ANDREW B. BARTELS  *  
4  *    COPYRIGHT (C) 1986  *  
5  *****  
6  *EXEC&H7FD1 TO ENABLE   *  
7  *EXEC&H7FDE TO DISABLE IT *  
8  *POKE32720,X - X IS FROM *  
9  * 0 TO 63 TO SELECT COLOR *  
10 *****  
11 CLEAR200,&H7FCF:WIDTH40:FORX-  
&H7FD0 TO &H7FF4:READA$:POKEX,VA  
L("H"+A$):NEXT  
12 DATA0,BE,1,D,BF,7F,F3,8E,7F,E  
5,BF,1,D,39,BE,7F,F3,BF,1,D,39,3  
4,2,B6,7F,D0,B7,FF,9A,35,2,6E,9F  
.7F,F3,0,0  
13 EXEC&H7FD1
```

Listing 2: BORDERA

```
00100 *COCO III BORDER COLOR CHANGER  
00110 *BY ANDREW B. BARTELS  
00120 *COPYRIGHT (C) 1986  
00130          ORG    $7FD0  
00140 CNUM    FCB    0  
00150 INIT    LDX    $10D    GET VECTOR  
00160 STX    JUMP   SAVE IT FOR LATER  
00170 LDX    #BORDER POINT TO ROUTINE  
00180 STX    $10D    SAVE IT  
00190 RTS    RETURN TO BASIC  
00200 DONE   LDX    JUMP   GET PREVIOUS ADDR  
00210 STX    $10D    SAVE IT  
00220 RTS    RETURN  
00230 BORDER  PSHS   A      SAVE A  
00240 LDA    CNUM   GET VALUE  
00250 STA    $FF9A  SAVE IN PIA  
00260 PULS   A      GET A BACK  
00270 JMP    [JUMP] GO TO INTERRUPT SERVICE ROUTINE  
00280 JUMP   FDB    0  
00290 END    INIT
```

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Weights & Measures

by Larry Pittman

Would you like to know your weight in stones? Your height in centimeters? Or familiarize yourself with the metric system? *Measure* allows you to quickly convert from one type of measurement to another. I would normally not use a program like this with Disk BASIC since it requires finding the disk, loading the program and returning to the original disk and program. But with OS-9, the program is always available in the CMDS directory. OS-9's multitasking and windowing capabilities allow you to simply move to another window to run the program.

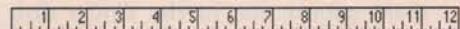
The procedures included in this program are *Measure*, *Calculate* and *LowUp*. *Measure* provides all of the necessary data for the conversion calculations. *Calculate* performs these calculations. *LowUp* changes a lowercase letter to an uppercase letter.

Measure examines the data statements for the various types of measurements. I have tried to include as many common measurements in this program as possible. Measurements not useful to the average user have been omitted. This program can be customized to include constants of your own choosing.

Operation

First enter the three procedures and save the source in a data directory. Then use BASIC09's pack* command to put them all into an executable file named *Measure* in the CMDS directory. Also make sure *rnb* is in your CMDS directory.

One important thing to remember is that the ESC key will not work properly unless



Larry Pittman is an electrical engineer who enjoys writing programs for his own use. He can be contacted by writing 11406 Majorca Place, Fenton MI 48430; or by calling 313-750-0047.

the programs have been packed. During normal operation after the programs have been packed, pressing ESC at the Main menu causes the program to quit. Pressing ESC at any other time returns you to the Main menu.

To get the program running, just enter *measure* at the OS9: prompt. The Main menu lists all the measurements available in the program. Options include Linear, Volume, Weight, Force, Power, wOrk, Area, Dry, Temperature, Speed and tiMe. Notice that only one letter in each option is capitalized. Press the key corresponding to that capital letter to select the desired measurement. A sub-menu within the chosen measurement category then appears on the screen. For example, pressing P brings up the Power sub-menu. This menu provides options for Watts, Horsepower, Btu/min, Ergs/sec, Kilowatts, Ft lbs/sec and bTu/hr. Once again, the capital letters represent which key to press to select the input measurement. For example, select Watts by pressing W. You are asked for the value in watts you want to convert and the units to which you want it converted. Press the appropriate capital letter and you will be given the conversion. If you press an invalid letter, a beep sounds and the program waits for a correct response.

Accuracy

Some of the values in the data statements are carried out to several decimal places. This may seem extreme, but it was done to ensure some degree of accuracy. For example, if 24 inches is the input value and feet is the output measure, the result would be displayed as 2.000 feet. The answer is displayed to four decimal places with the least significant digit accurate to plus or minus one.

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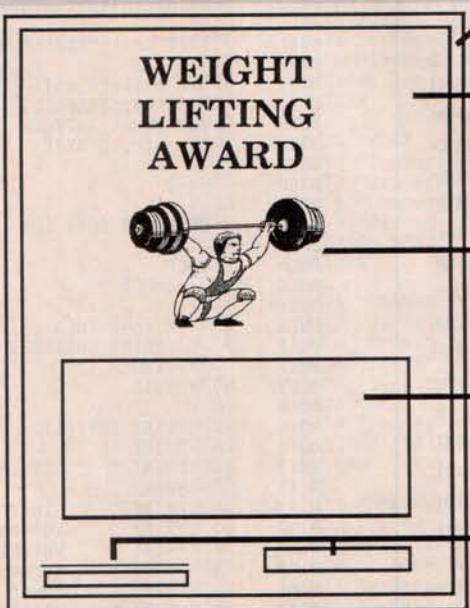


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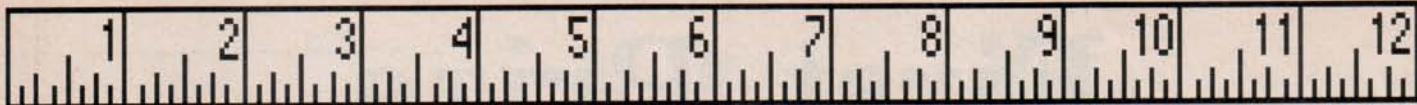
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of the individual user. New measurements and even new categories can be added to the existing program.

To add to an existing category, select a unique capital letter and determine the factor for each new measurement. In the first data statement for each category is a group of seemingly random capital letters. The new capital letter must be added to this sequence in the same location as the new measurement is placed in the data statements. The obvious limit would be the 26 letters available in the alphabet. Exceed this limit and you must use numbers or other symbols. The procedures are currently set to handle a maximum of 21 measurements per category. If you exceed this limit, increase the size of arrays name and value in the TYPE statements at Offset \$006F in Measure and Offset \$0000 in calculate.

Measurements can also be deleted from the program. It is advised, however, that you leave the base measurement intact. The base measurement in each category can be identified as the one with the factor set to one. If the base measurement is deleted, choose a new base measurement by setting its factor to one and revising all the remaining factors.

The factor, the number following the measurement type, is determined by finding the number of base measurements per desired measurement. For example, examine the Linear measures data beginning in Line 110 of the Measure procedure. Note that the base measure is in meters since 1 is its factor. The number following every other measurement represents the number of meters in that other measurement. There are 1000 meters in a kilometer, so the number following kilometer is 1000.

The above examples do not apply to the Temperature category since these conversions are calculated differently. I am not aware of any temperatures other than Kelvin, Centigrade and Fahrenheit.

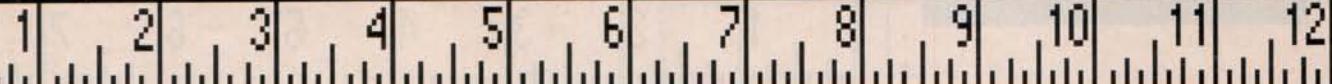
A new category is added in much the same manner as a new measurement. First, determine a unique name and letter for the category. Modify Offset \$01E5 in the Measure procedure to add the new letter. Add the new category name for the Main menu at Offset \$01AB. Add ,220 to the end of Offset \$0228. Finally add data lines at the end of Measure, beginning with Line 220. Use the format of the already existing DATA lines. Note that this represents a new subroutine and must be ended with a RETURN statement. □

OS-9 Level 2



The Listing: Measure.b09

```
PROCEDURE Measure
 0000      (* Weights and Measures *)
 001A      (* Written by Larry Pittman *)
 0038      (* Copyright (c) January 1991 *)
 0058      (* By Falsoft, Inc. *)
 006E
 006F      TYPE unit=findstr.mname.name(21):STRING; value(21):REAL
 0092
 0093      DIM measure:unit
 009C      DIM key:STRING[1]
 00A8      DIM count:INTEGER
 00AF      DIM ptr,en:BYTE
 00BA
 00BB      en=0
 00C2
 00C3      ON ERROR GOTO 100
 00C9
 00CA      LOOP
 00CC 100    en=ERR
 00D5
 00D6      IF en=2 THEN
 00E2          PRINT CHR$(12)
 00E7          END
 00E9      ENDIF
 00EB
 00EC      PRINT CHR$(12)
 00F1      PRINT
 00F3      PRINT "    CONVERSIONS--MAIN MENU"
 0111      PRINT
 0113      PRINT "    Linear           Area"
 0130      PRINT "    Volume           Dry"
 014C      PRINT "    Weight           Temperature"
 0170      PRINT "    Force            Speed"
 018E      PRINT "    Power            time"
 01AB      PRINT "    wOrk"
 01B7      PRINT
 01B9      PRINT "Make Selection: ";
 01CF
 01D0      REPEAT
 01D2          GET #0,key
 01DB          RUN LowUp(key)
 01E5          ptr=SUBSTR(key,"LAVDWTFSPO")
 01FB
 01FC      IF ptr=0 THEN
 0208          PRINT CHR$(7); CHR$(8); " "; CHR$(8);
 021A          ENDIF
 021C          UNTIL ptr<>0
 0227
 0228 025B      ON ptr GOSUB 110,120,130,140,150,160,170,180,190,200,210
 025B
 025C      READ measure.findstr
 0265      READ measure.mname
 026E
 026F      FOR count=1 TO LEN(measure.findstr)
 0284          READ measure.name(count)
 0290          READ measure.value(count)
 029C          NEXT count
 02A7
 02A8      RUN Calculate(measure)
 02B2      ENDLOOP
 02B6
 02B7 110  DATA "OMCTKSIFYENRU AHL"
 02D1      DATA "Linear Measure Conversions"
 02F2      DATA "micrOns",.000001
 0307      DATA "Millimeters",.001
 0320      DATA "Centimeters",.01
 0339      DATA "meTers",.1
 0349      DATA "Kilometers",.1000
 035E      DATA "mils",.0000254
 0370      DATA "Inches",.0254
 0384      DATA "Feet",.3048
 0396      DATA "Yards",.9144
 03A9      DATA "std milEs",.1609.344
```



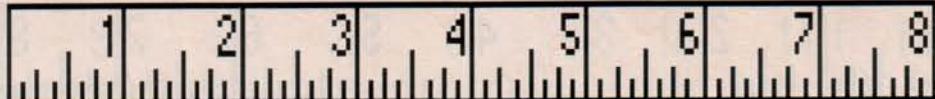
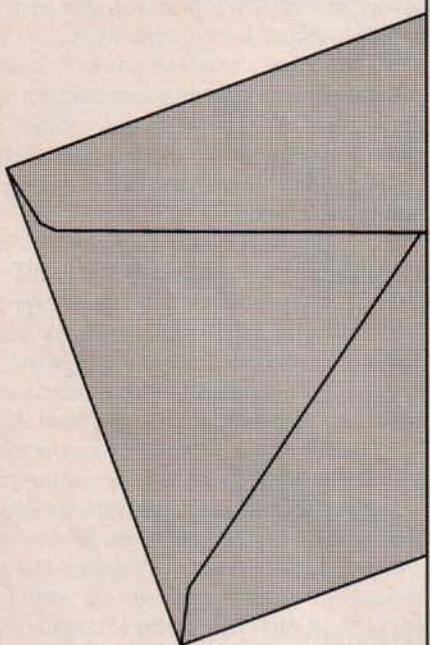
03C0	DATA "Naut miles",1853.2663	0A42	DATA "long hundredWeight",112
03D8	DATA "RodS",5.0292	0A5E	DATA "short Tons",2000
03EA	DATA "fUrlongs",201.168	0A73	DATA "Long tons",2240
0400	DATA "fAthoms",1.8288	0A87	DATA "ounCes (troy)",.0685687
0415	DATA "cHains (surveyor)",.20.116	0AA2	DATA "pEnnyweights",.0034284
0434	DATA "Links (surveyor)",.201168	0ABC	DATA "pounds (troy)",.8228244
0452	RESTORE 110	0AD7	DATA "scrUples",.002857
0457	RETURN	0AE0	DATA "dRams (apoth)",.085714284E-02
0459		0B08	DATA "ouNces (apoth)",.0685687
045A 120	DATA "MCTKIFYEAOHR"	0B24	DATA "poundS (apoth)",.8228562
0470	DATA "Area Measure Conversions"	0B40	DATA "Milligrams",2.2046E-06
048F	DATA "square Millimeters",.000001	0B58	DATA "Grams",.0022046
04AF	DATA "square Centimeters",.0001	0B68	DATA "Kilograms",2.2046
04CF	DATA "square meTers",1	0B82	DATA "Stones",14
04E6	DATA "square Kilometers",1000000.	0B92	RESTORE 150
0505	DATA "square Inches",.00064516	0B97	RETURN
0520	DATA "square Feet",.092903	0B99	
0539	DATA "square Yards",.836127	0B9A 160	DATA "KCF"
0553	DATA "square milEs",.2589990.	0BA7	DATA "Temperature Conversions"
0560	DATA "Acres",.4046.8626	0BC5	DATA "degrees Kelvin",273.15
0580	DATA "square rOds",.25.293	0BE1	DATA "degrees Centigrade",0
0599	DATA "Hectares",10000	0BFD	DATA "degrees Fahrenheit",32
05AC	DATA "aRes",.100	0C19	RESTORE 160
05BA	RESTORE 120	0C1E	RETURN
05BF	RETURN	0C20	
05C1		0C21 170	DATA "GDSNP"
05C2 130	DATA "MCTHFYSLIPQAURGNDOB"	0C30	DATA "Force Conversions"
05E0	DATA "Volume Measure Conversions"	0C48	DATA "Grams",.009803921
0601	DATA "cubic Millimeters",.000001	0C58	DATA "Dynes",.00001
0620	DATA "cubic Centimeters",.001	0C6E	DATA "Slugs",143.09216
063F	DATA "cubic meTers",.1000	0C81	DATA "Newtons",1
0656	DATA "cubic inHes",.01638807	0C92	DATA "Pounds",4.448
0670	DATA "cubic Feet",.28.32	0CA6	RESTORE 170
0688	DATA "cubic Yards",.254.88	0CAD	RETURN
06A1	DATA "milliliters",.001	0CAE 180	DATA "MCNTRKIFEL0"
06BA	DATA "Liters",1.	0CC3	DATA "Speed (Velocity) Conversions"
06CE	DATA "gIlls",.1183	0CE6	DATA "Millimeters/sec",.1968504
06E1	DATA "Pints",.4732	0D03	DATA "Centimeters/sec",1.968504
06F4	DATA "Quarts",.9463	0D20	DATA "centimeters/min",.0328084
0708	DATA "teASpoons",.0049291	0D30	DATA "meTers/sec",196.8504
071F	DATA "tablEspoons",.0147875	0D55	DATA "meteRs/min",3.28084
0738	DATA "cUps",.2366	0D60	DATA "Kilometers/hr",.54.6832
074A	DATA "imperial quaRts",1.13649	0D88	DATA "Inches/sec",5,"Feet/sec",.60
0767	DATA "Gallons",.3.7854	0DAA	DATA "fEet/min",1
077C	DATA "imperial galloNs",.4.54596	0DBC	DATA "miles/hr",.88
079A	DATA "Drams",.0036966	0DCE	DATA "knOts",101.33423
07AD	DATA "Ounces",.029576	0DE1	RESTORE 180
07C1	DATA "Barrels",.119.24	0DE6	RETURN
07D6	RESTORE 130	0DE8	
07DB	RETURN	0DE9 190	DATA "WKHFBTE"
07DD		0DFA	DATA "Power Conversions"
07DE 140	DATA "PQKBLAEURHIFMCT"	0E12	DATA "Watts",1
07F7	DATA "Dry Measure Conversions"	0E21	DATA "Kilowatts",1000
0815	DATA "Pints",.5	0E35	DATA "Horsepower",745.7122
0828	DATA "Quarts",1	0E4D	DATA "Ft-lbs/sec",1.35581
0838	DATA "peckS",.8	0E65	DATA "Btu/min",17.58036
0847	DATA "Bushels",.32	0E7A	DATA "bTu/hr",.293006
0858	DATA "barrelS",.104.91428	0E8E	DATA "Ergs/sec",.0000001
086D	DATA "teASpoons",.0052083	0EA4	RESTORE 190
0884	DATA "tablEspoons",.015625	0EA9	RETURN
089D	DATA "cUps",.25	0EBAB	
08AF	DATA "imperial quaRts",1.0321	0EAC 200	DATA "WDHMSLC"
08CC	DATA "imperial bushels",.33.024	0EBD	DATA "Time Conversions"
08EA	DATA "cubic Inches",.0148808	0ED4	DATA "Weeks",168
0904	DATA "cubic Feet",.25.714022	0EE3	DATA "Days",24
091C	DATA "cubic Millimeters",.9.0808E-07	0EF1	DATA "Hours",1
093B	DATA "cubic Centimeters",.00090808	0F00	DATA "Minutes",.016666667
095A	DATA "cubic meTers",.908.08	0F15	DATA "Seconds",2.77777778E-04
0974	RESTORE 140	0F2A	DATA "milliseconds",2.77777778E-07
0979	RETURN	0F44	DATA "microseconds",2.77777778E-10
097B		0F5E	RESTORE 200
097C 150	DATA "IAOPHQWTLCYURNDMGKS"	0F63	RETURN
099A	DATA "Weight Conversions"	0F65	
09B3	DATA "grains",1.4285714E-04	0F66 210	DATA "JEBFKH"
09C7	DATA "drAms (avdp)",.00390625	0F76	DATA "Work Conversions"
09E1	DATA "Ounces (avdp)",.0625	0F8D	DATA "Joules",.000948
09FC	DATA "Pounds (avdp)",1	0FA1	DATA "Ergs",.0.948E-10
0A13	DATA "short Hundredweight",.100	0FB3	DATA "Btu's",1
0A30	DATA "Quarters",.25		

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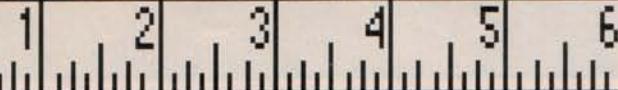
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```
0FC2      DATA "Ft-lbs"..001286
0FD6      DATA "Kilowatt-hours".3415.3
0FF2      DATA "Horsepower-hours".2543.882
1010      RESTORE 210
1015      RETURN

PROCEDURE Calculate
0000      TYPE unit=findstr,mname,name(21):STRING; value(21):REAL
0023      PARAM measure:unit
0020
002E      DIM key:STRING[1]
003A      DIM count:INTEGER
0041      DIM ptr,en:BYTE
004C      DIM invalue,outvalue,factor:REAL; inname,outname:STRING
0065
0066
006D
006E      en=0
006E      ON ERROR GOTO 100
0074
0075      LOOP
0077 100    en=ERR
0080
0081      IF en=2 THEN
0080      END
008F      ENDIF
0091
0092      PRINT CHR$(12)
0097      PRINT
0099      PRINT "    "; measure.mname
00A8      PRINT
00AA
00AB      FOR count=1 TO LEN(measure.findstr) STEP 2
00C5      PRINT measure.name(count);
00D1
00D2      IF count+1<=LEN(measure.findstr) THEN
00E6      PRINT TAB(22); measure.name(count+1)
00F8      ELSE
00FC      PRINT
00FE      ENDIF
0100      NEXT count
010B
010C      PRINT
010E      PRINT "Select Input Units: "
0128
0129      REPEAT
0128      GET #0,key
0134      RUN LowUp(key)
013E      ptr=SUBSTR(key,measure.findstr)
0140
014E      IF ptr=0 THEN
015A      PRINT CHR$(7); CHR$(8); " "; CHR$(8);
016C      ENDIF
016E      UNTIL ptr<>0
0179
017A      factor=measure.value(ptr)
0188      inname=measure.name(ptr)
0196      PRINT
0198      PRINT
019A      PRINT "Enter value in "; inname; " you wish to convert: ";
01CC      INPUT invalue
01D1
01D2      IF measure.findstr="KCF" THEN
01E4      factor=invalue-factor
01F0
01F1      IF ptr=3 THEN
01FD      factor=factor*5/9
020D      ENDIF
020F      ENDIF
0211
0212      PRINT
0214      PRINT "Select Units to Convert to: "
0236
0237      REPEAT
0239      GET #0,key
0242      RUN LowUp(key)
024C      ptr=SUBSTR(key,measure.findstr)
025B
025C      IF ptr=0 THEN
0268      PRINT CHR$(7); CHR$(8); " "; CHR$(8);
```



```

027A      ENDIF
027C      UNTIL ptr<>0
0287
0288      IF measure.findstr="KCF" THEN
0289          IF ptr=1 THEN
0290              outvalue=factor+273.15
0291          ENDIF
0292
0293          IF ptr=2 THEN
0294              outvalue=factor
0295          ENDIF
0296
0297          IF ptr=3 THEN
0298              outvalue=1.8*factor+32
0299
0300      ELSE
0301          outvalue=factor*invalue/measure.value(ptr)
0302      ENDIF
0303
0304      outname=measure.name(ptr)
0305      PRINT CHR$(12)
0306      PRINT " "; measure.mname
0307      PRINT
0308      PRINT " " ; invalue; " " ; inname; " = "
0309
0310      IF outvalue>9999 OR outvalue<.01 AND outvalue>0
0311      THEN
0312          PRINT USING "E12.3",outvalue;
0313      ENDIF
0314
0315      IF outvalue>=100 AND outvalue<-9999 THEN
0316          PRINT USING "R7.1",outvalue;
0317      ENDIF
0318
0319      IF outvalue>=10 AND outvalue<100 THEN
0320          PRINT USING "R7.2",outvalue;
0321      ENDIF
0322
0323      IF outvalue>=1 AND outvalue<10 THEN
0324          PRINT USING "R6.3",outvalue;
0325      ENDIF
0326
0327      IF outvalue<1 AND outvalue>=.01 THEN
0328          PRINT USING "R7.4",outvalue;
0329      ENDIF
0330
0331      IF outvalue<=0 THEN
0332          PRINT USING "R8.2",outvalue;
0333      ENDIF
0334
0335      PRINT " "; outname
0336      PRINT
0337      PRINT
0338      PRINT "<ANY KEY>; Return to "; measure.mname
0339      PRINT "<ESC>; Return to MAIN menu"
0340      GET #0,key
0341      ENDLOOP
0342  END
0343
0344 PROCEDURE LowUp
0345     DIM char:BYTE
0346     PARAM answer:STRING[1]
0347
0348     char=ASC(answer)
0349
0350     IF char>96 AND char<123 THEN
0351         char=char-32
0352     ENDIF
0353
0354     answer=CHR$(char)
0355 END

```

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A Trip to the Post Office

by Steve Blyn
Contributing Editor

This article marks the 101st consecutive installment of my column. I feel I have accomplished what I set out to accomplish many years ago. As a result, this will be my final chapter.

When I purchased my original Coco in early 1981, it was touted by Radio Shack as mainly a game machine. There were those of us who knew of its other possibilities. My forte was in the field of education. I was determined to use this computer to help my children and students learn. I knew computers could present educational material in new and interesting ways.

My faith was justified. Through my software company, Computer Island Educational Software, I learned firsthand that many schools, throughout not only this country but nations worldwide, had purchased CoCos and successfully used them to further the educational process. The Network II made CoCos very economical for classroom use. Creative minds developed excellent word processors, voice synthesizers, musical programs, touch pads and video digitizers. All of these became wonderful computer adjuncts and subject material for my columns as well as instructional tools in my classroom.

The Color Computer has had the longest life in the history of personal computers. Our early competitors like the Sinclairs, Apple I's and II's, Vic 20's, Commodore 64's, PC Jr.'s and Texas Instruments have all become obsolete. The CoCo is the only one that remains compatible with its origi-

nal version. This did not happen simply by chance. Much of the credit for the CoCo's longevity must go to Lonnie Falk for having the insight to create THE RAINBOW and grow with the industry.

This month's column reviews the life-skill math problem of buying multiples of stamps and postcards at a post office.

about what else I could do with the CoCo.

This month's column reviews the life-skill math problem of buying multiples of stamps and postcards at a post office. The program helps to review arithmetic through verbal problems. In each example, random numbers of stamps and postcards are to be purchased. The student has four individual tasks to compute in each example. The amount needed for a random number of stamps is figured, followed by the amount for a random number of postcards. Then the amounts are added. Finally, the student computes the change received from \$10.

This program is suitable for middle-grade elementary students or anyone who might benefit from the arithmetic practice. The answers can be calculated mentally or with pencil and paper. Each portion of the problem must be answered correctly for the program to continue. This provides the children a way to monitor their progress. There is no limit on either the number of incorrect answers given to a problem or the time taken to successfully compute a problem. This lack of time restrictions is designed to improve the speed and accuracy of problem solving.

There are limits on the amount of 25-cent stamps and 15-cent postcards purchased in each example. These variables are on Line 50 and are as follows: Variable A is the number of stamps; Variable B is the number of postcards; Variable C is the total; and Variable D is the amount of change from a \$10 bill. You can change variables A and B to modify the program's difficulty for your children.

As stated earlier, this is my final article. However, I repeat my long-standing offer for you to share any thoughts on programs, articles or educational matters with me. I have always enjoyed and appreciated your communications. And I encourage the continuation of this relationship. □

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

<input checked="" type="checkbox"/>	70	245
	160	5
	250	175
	END	51

The Listing: MAIL

```

0 'EDUCATION NOTES
1 'WRITTEN BY STEVE BLYN
2 'PUBLISHED JANUARY 1991
10 REM"MAILING LETTERS"
20 REM"STEVE BLYN, COMPUTER ISLAND, STATEN ISLAND, NY, 1990"
30 CLEAR 1000:J=RND(-TIMER):CLS5
:LINEINPUT"SELECT ANY NAME ";N$"
40 IF LEN(N$)>12 OR LEN(N$)<2 THEN 30
50 A=3+RND(6):B=6+RND(6):C=(A*.2

```

```

5)+(B*.15):D=10-C:P$=STRING$(32,
255)
60 CLS0:PRINT@7,"MAILING LETTERS":PRINT@32,P$:
70 PRINT@64,N$;" WENT TO THE POST OFFICE TO MAIL SOME LETTERS."
80 PRINT"OFFICE TO MAIL SOME LETTERS."
90 PRINT@160,"THE MAIL FOR THIS TRIP WAS ..."
100 PRINT@192,A;"REGULAR LETTERS AND":PRINTB;"POST CARDS."
110 PRINT@128,P$::GOSUB 280:PRINT@256,P$:
120 PRINT@288,"WHAT WAS THE COST OF":
130 GOSUB 280:PRINT@325." ":PRINT@325."1. THE LETTERS? ";
140 LINEINPUT A$:AA=VAL(A$)
150 IF INT((100*AA)+.01)=INT(A*2) THEN PLAY"L50CDEGG" ELSE 130
160 GOSUB 280:PRINT@355." ":PRINT@355."2. THE POST CARDS? ";

```

```

170 LINEINPUT B$:BB=VAL(B$)
180 IF INT((100*BB)+.01)=INT(B*1) THEN PLAY"L50CDEGG" ELSE 160
190 GOSUB 280:PRINT@385." ":PRINT@385."3. THE TOTAL OF BOTH? "
200 LINEINPUT C$:CC=VAL(C$)
210 IF INT((100*CC)+.01)=INT(C*1) THEN PLAY"L50CDEGG" ELSE 190
220 PRINT@416,P$::GOSUB 280:PRINT@448."WHAT CHANGE FROM $10.00? ";
230 LINEINPUT D$:DD=VAL(D$)
240 IF INT((100*DD)+.01)=INT(D*1) THEN PLAY"L50CDEGG" ELSE 220
250 PRINT@484."PRESS enter TO CONTINUE":
260 EN$=INKEY$
270 IF EN$=CHR$(13) THEN RUN ELSE 260
280 PLAY"802L20CDEFGAB;03C":RET
290 CLS:END

```

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How Cold is it?

by Tony DiStefano
Contributing Editor

I came across a neat little part the other day and thought it could be used for a great project. Readers are always asking me about connecting their computer to the real world. I have done many projects, but this one is a little different. The part I saw is an LM34. At first glance, it looks like just another transistor. But, don't transistors start with 2N or something? This part number starts with an LM. When I think of LM I think of something linear like an op amp, a voltage regulator or comparator and not a transistor. Maybe this is a *voltage reference*. A voltage reference is a part that provides a very precise voltage.

For example, if you have a 2.5-volt reference it looks just like a plastic transistor. It has three pins; not a base, collector and emitter, but an input, an output and ground. The input is some voltage greater than the expected output, the output is a very precise 2.5 volts and the ground is common to all. Even if the input voltage changes, as long as it is within specs the output voltage will never change. Hence, the name *reference*. If you want to compare another voltage with this reference, you can always tell if the unknown voltage is higher or lower by using a comparator circuit.

This LM34 is much like a voltage reference, but the output voltage changes a bit. Not a very good reference, you might say. But the output voltage changes quite predictably. Most importantly, it is directly proportional to the surrounding temperature. That's right, it gives a precise way of measuring temperature. When properly connected, this device gives you a current that can be translated into a temperature

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec. Tony's user-name on Delphi is DISTO.

reading. The specifications for the LM34 state that the output delivers 1 mA per degree Fahrenheit.

When properly connected, this device gives you a current that can be translated into a temperature reading.

Connect this device to a 100-mA meter, pencil in a scale and you have a temperature gauge. This works, but you could just go out and buy a thermometer to do the same thing. This is not what I have in mind. What I want is for my CoCo to read the current and provide a digital readout. There is only one problem, the CoCo cannot read milliamps. It reads only zeros and ones. But, wait! We can use an A-to-D converter to perform the task. A-to-D means analog-to-digital. I will use one of these along with some other supporting circuitry to read the LM34. In order for a digital computer to talk to an analog device, a lot of circuitry is required. The rest of this column is dedi-

cated to the circuitry required to read the LM34.

In the past, I have used the *SCS pin as an I/O area. This pin is mapped at \$FF40 to \$FF5F and is the same area that is used by the floppy-disk controller. This tends to confuse many users. Then comes the Multi-Pak Interface, which gives CoCo users four slots, each with its own switchable *SCS area. It is a simple way to have more than one I/O device connected to the CoCo. But the Multi-Pak has been discontinued and many users go the way of the Y cable. The only problem with this is that anything that uses the *SCS pin conflicts with the disk controller and will not work. But there is another way. By decoding the complete CoCo address bus, a circuit can reside in an unused area of the memory map.

Look at U1, U2A and U2B in Figure 1. These chips make up a new memory map area. U1 is a 13-input NAND gate. This means the output (Pin 9) goes Low when all of its inputs are High. U2A and U2B act as double-input inverters. When the two inputs are Low, the output goes High. So, if you study which address lines go straight into U1 and which get inverted first, you can calculate what address area causes the output of U1 to go Low. In this case the address area is \$FFA8 to \$FFA9. The reason the output is active for two locations is that Address Line A0 is not connected to the circuit. If A0 is High or Low, there is no change to the output. Since there are no devices active at either of these memory locations, there is no bus conflict and the circuit will work with just a Y cable.

If you have a device connected at this address, change the address lines from the High area to the Low. For example, if you swap A4 with A3, the address location changes to \$FFB6 and \$FFB7. You can change the address lines around to whatever map address you want. You have to be careful where it is mapped though. New devices

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But there are even greater advantages to the **Tomcat** system -- and an affordable path to upgrade your CoCo without losing any of the value you have in your CoCo system today.

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must be mapped to a free area in the memory map. A good knowledge of the CoCo's memory map is necessary if you want to change the circuit from what it is.

U3 is the heart of the circuit. It is an ADC0804 and is not hard to find. As you can see in Figure 1, U3 has eight data lines that connect directly to the CoCo's bus. The Chip Select line (*CS) connects to our memory map decoder. This device has two separate lines for reading (*RD) and writing (*WR). This is mainly for Intel products that have separate signals coming from the CPU. The CoCo's CPU uses one Read/Write line, so the inverter (U2C) is used to generate the required signal.

On the other side of the chip, we start at the top with VI+. This is the analog input to the device. VI- is set to ground in this circuit, but can be used as a differential input if need be. The next two pins are the CLKR and CLK inputs. The ADC0804 uses a technique known as *successive approximation* to determine the unknown input voltage. A clock input is needed to shift the data to its proper registers. This clock is

controlled by the RC constant at the two clock pins. Without going into many details, the required clock signal is achieved by the values given in the diagram. The complete conversion requires 64 clock cycles. The typical clock frequency is about 640 kHz, which gives this device the ability to do about 9000 conversions per second. This is quite slow by comparison to the flash converter but is fast enough for this application. If you want more details on this ADC, look it up in the National Semiconductor Corporation *Linear Databook 2*.

The next input on the data side is VREF. When used, this Voltage Reference input pin serves as an exterior voltage reference. When not used, the internal VCC voltage is used. We'll look at this pin more closely later when we connect the LM34. The last pin is the Analog Ground signal (AGND). In this circuit it is connected to the computer's ground, but the two can be different.

To construct this circuit, use the standard tools for project building. Apart from the soldering iron and other small tools, the following parts are needed for this portion

of the project:

Part Number Part name

U1	74HC133
U2	74HC02
U3	ADC0804
R1	10K, 1/4-watt resistor
C1	150pF, 25v cap

MISC	1 - 14-pin socket
	1 - 16-pin socket
	1 - 20-pin socket
	3 - .1μF, 25v cap
	1 - project board
	1 - Y cable or MPI

Remember to use the sockets when assembling the circuit. Use the three .1μF caps to decouple the power supply. These must be placed close to the sockets. Connect one side to +5 volts and the other to ground. As usual, the +5-volts and ground signals to the ICs are not marked in the diagram to keep the diagram clean. A connection list for the ICs is given below:

Part #	+5v	GND
U1	16	8
U2	14	7
U3	20	10

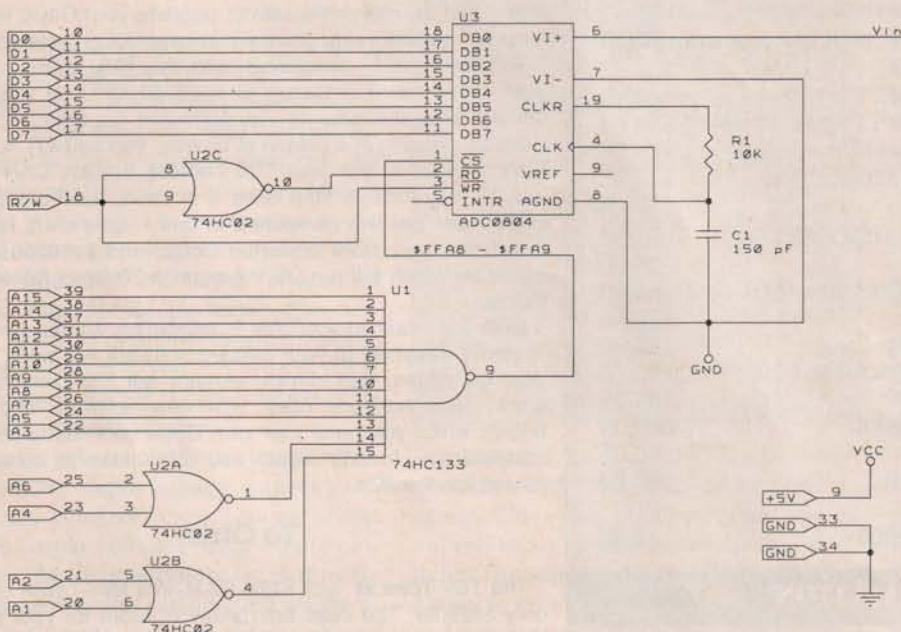


Figure 1

The two TTL ICs used in this circuit are of the HC family. If you cannot find this family, the LS family will work just as well. Remember these ICs are CMOS and require careful handling. The project board can be any CoCo-bus compatible board. The only place I know to still get them is CRC. See their ad in THE RAINBOW. When soldering in the sockets, make sure to leave space for more ICs. I see a need in the near future for expansion of this circuit.

For those interested in back issues of "Turn of the Screw" I now have a book that includes all of my columns beginning with the first one from January of 1983. The book is called *A Full Turn of the Screw* and is available from several CoCo dealers in both the United States and Canada, as well as from THE RAINBOW.

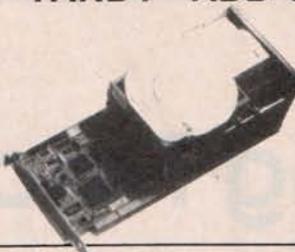
Next time, I'll finish the circuit for the LM34 and include information on how to gain access to the data from assembly language and BASIC.

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Visualizing Fractions 2

by Fred B. Scerbo
Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

Visualizing Fractions 1 was a special program created last year for the CoCo. The fact that the program name ended with 1 should have been an indication that a sequel would follow. Unlike most sequels, Visualizing Fractions 2 is not an inferior copy of the original. Instead, it is the next logical step in our study of fractions. The first version of the program concentrated on simple identification of fractional parts from $\frac{1}{2}$ to $\frac{1}{9}$ and used the Opposites matrix which allows the user to use only ENTER and the space bar. Visualizing Fractions 2 is a completely different program.

This program concentrates on the relationship between different fractional parts and uses graphics to demonstrate the concept. For example, the first program showed the relationship between the written and visual representations of the fractions, this second program shows two fractions, both written and visual, and asks if the first fraction is: A) larger than; B) equal to; or C) less than the second fraction. For the correct answer press either A, B or C. As in all

our programs, pressing the @ key sends you to the score card and pressing C lets you pick up where you left off.

Another major change is the inclusion of instructions at the beginning of the program. Pressing ENTER at the title card allows for four levels of difficulty. Choose your level of play by pressing numbers 1 through 4. The instructions are then displayed on the screen. Press ENTER to start the program.

Inner Workings

There are some major changes in how this program actually works as compared to our other recent educational programs. First of all this is a quiz, not an instructional program. The student gains knowledge with this program, but this knowledge is tested and graded.

Another difference with this program is that parts of it run slower than other similar programs. This slowness is due to the use of the GET and PUT commands. Since the choice of a wrong response will invert the graphics on the screen in a flashing manner, these commands are used to create the inverted screen on a lower graphics page. This is accomplished by using the NOT switch in the PUT command. This reverses whatever we had for graphics.

These graphics were a little more difficult to draw than in its predecessor. We could not simply draw the lines of the fraction and color in one part. Instead, if we had a fraction like $\frac{1}{2}$, we would also have to redraw in white the parts of the fraction which would be obliterated by our PAINT command. Therefore, by using two DRAW commands we are able to reinsert the miss-

32K Extended	
25	21 455
55	211 510
105	252 560
130	93 605
150	14 645
165	120 685
230	252 720
290	117 760
355	77 800
405	190 850
	125 890
	35 930
	91 965
	128 995
	103 1025
	127 1055
	51 1100
	93 END
	54

The Listing: VISFRAC2

```

1 REM*****
2 REM* VISUALIZING FRACTIONS 2 *
3 REM* COPYRIGHT JANUARY 1991 *
4 REM* BY FRED B. SCERBO *
5 REM* 60 HARDING AVENUE *
6 REM* NORTH ADAMS, MA 01247 *
7 REM*****
10 CLEAR3000
15 CLS0:PRINT$((32,188);STR
ING$(32,204)::FORI=1TO 224 :READ
A:PRINTCHR$(A+128)::NEXT
20 DATA29,28,28,26,30,28,29,21,2
8,29,21,28,29,21,28,30,29,20,30,
21,28,29,20,30,18,29,24,30,29,85
,92,93
25 DATA21,,24,26,,21,21,,21,21.

```

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

ing lines for the student to see the division in the graphics. I think you will see the effectiveness of this improvement.

Finally, we had to add the value of each fraction to our equation. The decimal values in the data statements correspond to the fractions being drawn — both $\frac{1}{2}$ and $\frac{2}{4}$ are represented by the value .5 in the data. With this method, the fractions can be compared to determine which is larger, smaller or if they are equal.

Conclusion

I kept this article short and to the point since there is so much typing with this listing. The length of this listing is due to the amount of drawing required.

Let me know what you think of the graphics in this program. I welcome any ideas you might have for parts 3 and 4 of this series.

See you next month.

```

20,20.,26.20.,26,21.,21.,26,26,
21.,26...,85
30 DATA21,,,18,26,,21,21,16,21,2
1.....26...,26,21.,21.,26,21,21.,
26...,85
35 DATA21,28,28,26,30,29,28,21,2
8,29,21,...,26...,26,21.,21.,26,2
0,23..,28,29,85,92,92
40 DATA21,,,26,21.,21.,21,21,21,
..26...,26,21.,21.,26..31...,21,85
;
45 DATA21,,,26,20,26,21.,21,21,
.21...,26...,26,21.,21.,26.,21.,18
,21,85..81
50 DATA28,24.,20,28.,28,20.,20,2
0,28,28.,20,28.,20,28,20,28,28,2
0,28..,28,24,28,28,84,92,92
55 PRINTSTRING$(32,195);STRING$(32,179);
60 PRINT@388," VISUALIZING FRACT
IONS 2 ";
65 PRINT@420." BY FRED B.SCR
BO      ":";PRINT@452." COPYRIGH
T (C) 1990      ";
70 X$=INKEY$:IFX$<>CHR$(13)THEN7
0
75 PRINT@452." SELECT LEVEL (1
-4)    ";
80 X$=INKEY$:IFX$=""THEN80
85 X=VAL(X$):IFX<-0THEN80
90 IF X>4THEN80
95 DIM A$(44),B$(44),A(44),C(400
)
100 XX=RND(-TIMER)
105 CLS:PRINT"PRINT" VISUALIZING
FRACTIONS 2 IS A PROGRAM DES
IGNED TO ALLOW THE STUDENT TO
ACTUALLY SEE THE RELATIONSHI
PS BETWEEN THE DISPLAYED F
RACTIONS."
110 PRINT" PRESS KEYS <A>, <B>,
OR <C> TO INDICATE IF THE 1ST F
RACTION IS LARGER THAN, EQUAL
TO, OR LESS THAN THE SECOND
FRACTION. IF YOU ANSWER CORRECT
LY, THE CORRECT SIGN <-, OR
> WILL BE"
115 PRINT" SHOWN. PRESS <ENTER>
FOR THE NEXT EXAMPLE, & THE <
@> KEY TO CHECK YOUR PROGRESS."
:
120 IFINKEY$<>CHR$(13)THEN120
125 CLS0:FORI=1TO44:READ A$(I),B
$(I):NEXT:FORI=1TO44:READ A(I):N

```

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EXT
 130 PMODE0,1:PCLS1:SCREEN0,0:LINE(0,0)-(255,192),PRESET,B
 135 LINE(0,80)-(255,104),PRESET,
 BF
 140 LINE(0,168)-(255,192),PRESET,
 ,BF
 145 DRAW"BM10,88C1R4ND8R4BR4D8U4
 R8U4D8BR4NR8U4NR8U4R8BR12D8U4NR8
 U4R8BR4D8BR4U8R8D4L8R4F4BR4R8U4L
 8U4R8BR4R4ND8R4BR12D8U4NR8U4R8BR
 4ND8R8D4L8R4F4BR4U8R8D4NL8D4BR4N
 R8U8R8BR4R4ND8R4BR4D8BR4NR8U8R8D
 8BR4U8F8U8BR12D8BR4R8U4L8U4R8BF8
 R2BR4R2BR4R2"
 150 DRAW"BM20,120C0U8R8D4NL8D4BR
 6E2U4H2BR18D8R6BR4U8R8D4NL8D4BR4
 U8R8D4L8R4F4BR4NR8U8R8D4NL2D4BR
 4NR8U4NR8U4R8BR4ND8R8D4L8R4F4BR1
 2B8U4R8D4BR4D8U4R8U4D8BR4U8R8D
 4NL8D4BR4U8F8U8BR22D8NR4U8R4BR1
 2F4G4BR18R2U8L2"
 155 DRAW"BM20,140C0R2NU8R6U4NL6U
 4NL8BR6F2D4G2BR18NR8U4NR8U4R8BR4
 NR8D8R8NH2NF2U8BR4D8R8U8BR4ND8R8
 D4NL8D4BR4NU8R6B8U8R12R4ND8R4BR4
 D8R8U8NL8BR58NR4D8R4BR10BU2R8BU4
 NL8U2BR10R4D8L4"
 160 DRAW"BM20,160C0NR8U8R8BR6F2D
 4G2BR18NU8R6BR4NR8U4NR8U4R8BR4NR
 8D4R8D4NL8BR4R8U4L8U4R8BR12R4ND8
 R4BR4D8U4R8U4D8BR4U8R8D4NL8D4BR4
 U8F8U8BR46D8NR4U8R4BR14G4F4BR14
 R2U8L2"
 165 DRAW"BM10,174C1R4ND8R4BR4D8U
 4R8U4D8BR4NR8U4NR8U4R8BR4NR
 8D4NL8BR4NR8U4NR8U4R8BR4NR8D8R8B
 R4NR8U8R8D8BR4U8F8U8BR4R2ND8R8D8
 NL10BR12"
 170 DRAW"U4NR8U4R8BR4ND8R4D8L8R4
 F4BR4U8R8D4NL8D4BR4NR8U8R8BR4R4N
 D8R4BR4D8BR4NR8U8R8D8BR4U8F8U8BR
 12BD8R2"
 175 PCOPY1T04
 180 IF X=1 THEN LV=9
 185 IF X=2 THEN LV=20
 190 IF X=3 THEN LV=35
 195 IF X=4 THEN LV=44
 200 A=RND(LV)
 205 B=RND(LV):IF B-A THEN205
 210 PCOPY4T01
 215 PMODE0,1
 220 CIRCLE(58,42),34,0..9
 225 DRAW"BM0,8C0"+A\$(A)
 230 PAINT(54,32),0,0
 235 DRAW"BM0,8C1"+B\$(A)
 240 CIRCLE(178,42),34,0..9
 245 DRAW"BM120,8C0"+A\$(B)
 250 PAINT(174,32),0,0
 255 DRAW"BM120,8C1"+B\$(B)
 260 PMODE0,1:GET(0,0)-(256,192),
 C,G:PMODE0,3:PUT(0,0)-(256,192),
 C,PRESET:PMODE0,1
 265 SCREEN1,1
 270 IF A(A)>A(B)THEN R\$="A"
 275 IF A(A)=A(B)THEN R\$="B"
 280 IF A(A)<A(B)THEN R\$="C"
 285 X\$=INKEY\$:IF X\$=""THEN285
 290 IF X\$="A"THEN295ELSEIF X\$="B"
 HEN295ELSEIF X\$="C"THEN295ELSEIF X\$
 ="@"THEN1090ELSE285
 295 IF X\$<>R\$ THEN 380
 300 PMODE0,2:PCLS1
 305 CIRCLE(58,92),34,0..9
 310 DRAW"BM0,58C0"+A\$(A)
 315 PAINT(54,82),0,0

320 DRAW"BM0,58C1"+B\$(A)
 325 CIRCLE(178,92),34,0..9
 330 DRAW"BM120,58C0"+A\$(B)
 335 PAINT(174,82),0,0
 340 DRAW"BM120,58C1"+B\$(B)
 345 IFR\$="A"THENDRAW"BM124,82C0F
 10G10R2E10H10"
 350 IFR\$="B"THENDRAW"BM122,90C0R
 12B0D4L12"
 355 IFR\$="C"THENDRAW"BM130,82C0G
 10F10R2H10E10"
 360 DRAW"BM42,30C0N20D20R20BR6U
 02R20D20NL20BR6U20R20D10L20R10F1
 0BR6U20R20D10L20R10F10BR6NR20U10
 NR20U10R20BR6D20NR20U20R20BR6R1
 0ND20R10":SCREEN1,1
 365 IF INKEY\$<>CHR\$(13)THEN365
 370 NC=NC+1
 375 GOTO200
 380 FORK=1TO4:PMODE0,3:SCREEN1,1
 :FOR Y=1TO10:NEXT Y:PMODE0,1:SCRE
 EN1,1:FOR Y=1TO10:NEXT Y,K
 385 NW=NW+1
 390 GOTO285
 395 GOTO395
 400 REM ONE HALF
 405 DATA"BR58BD34NU28ND28BR44BD1
 2NR8U4R8U4L8BU4L2R12L6BU4U8"
 410 DATA"BR"
 415 REM TWO HALVES
 420 DATA"BR"
 425 DATA"BR58BD34NU28ND28BR44BD1
 2C0NR8U4R8U4L8BU4L2R12L6BU4R4L8U
 4R8U4L8"
 430 REM ONE THIRD
 435 DATA"BR58BD34NU28M-26,+15M+2
 6,-15M+26,+15BR20BU2R8U4NL8U4L8B
 U4L2R12L6BU4U8"
 440 DATA"BR"
 445 REM TWO THIRDS
 450 DATA"BR58BD34NU28M-26,+15M+2
 6,-15M+26,+15BR20BU2C0R8U4NL8U4L
 8BU4L2R12L6BU4L4R8U4NL8U4L8"
 475 REM ONE FOURTH
 480 DATA"BR58BD34NU28ND28NL32R32
 BR22BD12U8D4L8U4B4U4L2R12L6BU4U8"
 485 DATA"BR"
 490 REM TWO FOURTHS
 495 DATA"BR58BD34NU28ND28R32BR22
 BD12U8D4L8U4B4U4L2R12L6BU4R4L8U4R
 8U4L8"
 500 DATA"BR58BD34NL32D28"
 505 REM THREE FOURTHS
 510 DATA"BR58BD34NU28R32BR22BD12
 U8D4L8U4B4U4L2R12L6BU4L4R8U4NL8U4
 L8"
 515 DATA"BR58BD34NL32D28"
 520 REM FOUR FOURTHS
 525 DATA"BR"
 530 DATA"BR58BD34NU28ND28NL32R32
 BR22BD12C0U8D4L8U4B4U4L2R12L6BU4B
 R4U8D4L8U4"
 535 REM ONE FIFTH
 540 DATA"BR58BD34NU28M-30,-10M+3
 0,+10M+30,-10M-30,+10NG22NF22BR4
 6BD12R8U4L8U4NR8BU4L2R12L6BU4U8"
 545 DATA"BR"
 550 REM TWO FIFTHS
 555 DATA"BR58BD34NU28M+30,-10M-3
 0,+10NG22NF22BR46BD12R8U4L8U4NR8

BU4L2R12L6BU4R4L8U4R8U4L8"
 560 DATA"BR58BD34M-30,-10"
 565 REM THREE FIFTHS
 570 DATA"BR58BD34NU28M+30,-10M-3
 0,+10NF22BR46BD12R8U4L8U4NR8BU4L
 2R12L6BU4L4R8U4NL8U4L8"
 575 DATA"BR58BD34M-30,-10M+30,+1
 0G22"
 580 REM FOUR FIFTHS
 585 DATA"BR58BD34NU28M+30,-10M-3
 0,+10BR46BD12R8U4L8U4NR8BU4L2R12
 L6BU4BR4U8D4L8U4"
 590 DATA"BR58BD34NU28M-30,-10M+3
 0,+10NG22NF22"
 595 REM FIVE FIFTHS
 600 DATA"BR"
 605 DATA"BR58BD34NU28M-30,-10M+3
 0,+10M+30,-10M-30,+10NG22NF22BR4
 6BD12C0R8U4L8U4NR8BU4L2R12L6BU4L
 4R8U4L8U4R8"
 610 REM ONE SIXTH
 615 DATA"BR58BD34NU28ND28M-26,+1
 5M+52,-30M-26,15M+26,+15M-52,-30
 BR70BD28NU4R8U4L8U4NR8BU4L2R12L6
 BU4U8"
 620 DATA"BR"
 625 REM TWO SIXTHS
 630 DATA"BR58BD34NU28ND28M-26,+1
 5M+52,-30M-26,15M+26,+15M-26,-15
 BR44BD12NU4R8U4L8U4NR8BU4L2R12L6
 BU4R4L8U4R8U4L8"
 635 DATA"BR58BD34M-26,-15"
 640 REM THREE SIXTHS
 645 DATA"BR58BD34NU28ND28M+26,-1
 5M-26,15M+26,+15M-26,-15BR44BD12
 NU4R8U4L8U4NR8BU4L2R12L6BU4L4R8U
 4NL8U4L8"
 650 DATA"BR58BD34M-26,-15M+26,+1
 5M-26,+15"
 655 REM FOUR SIXTHS
 660 DATA"BR58BD34NU28M+26,-15M-2
 6,15M+26,+15M-26,-15BR44BD12NU4R
 8U4L8U4NR8BU4L2R12L6BU4BR4U8D4L8
 U4"
 665 DATA"BR58BD34ND28M-26,-15M+2
 6,+15M-26,+15"
 670 REM FIVE SIXTHS
 675 DATA"BR58BD34NU28M+26,-15M-2
 6,15BR44BD12NU4R8U4L8U4NR8BU4L2R
 12L6BU4L4R8U4L8U4R8"
 680 DATA"BR58BD34ND28M-26,-15M+2
 6,+15M-26,+15M+26,-15M+26,+15"
 685 REM SIX SIXTHS
 690 DATA"BR"
 695 DATA"BR58BD34NU28ND28M-26,+1
 5M+52,-30M-26,15M+26,+15M-52,-30
 BR70BD28NU4R8U4L8U4NR8BU4L2R12
 L6BU4L4R8U4L8D4U8R8"
 700 REM ONE SEVENTH
 705 DATA"BR58BD34NU28M-24,-20M+2
 4,+20M-30,+4M+30,-4M-16,+25M+16,
 -25M+16,+25M-16,-25M+30,+4M-30,
 -4M+24,-20BR28BD32U8L8ND2BU4L2R12
 L6BU4U8"
 710 DATA"BR"
 715 REM TWO SEVENTHS
 720 DATA"BR58BD34NU28M-30,+4M+30
 ,-4M-16,+25M+16,-25M+16,+25M-16,
 -25M+30,+4M-30,-4M+24,-20BR28BD3
 2U8L8ND2BU4L2R12L6BU4R4L8U4R8U4L
 8"
 725 DATA"BR58BD34M-24,-20"
 730 REM THREE SEVENTHS
 735 DATA"BR58BD34NU28M-16,+25M+1
 6,-25M+16,+25M-16,-25M+30,+4M-30
 ,-4M+24,-20BR28BD32U8L8ND2BU4L2R

```

12L6BU4L4R8U4NL8U4L8"
740 DATA"BR58BD34M-24,-20M+24,+2
0M-30,+4"
745 REM FOUR SEVENTHS
750 DATA"BR58BD34NU28M+16,+25M-1
6,-25M+30,+4M-30,-4M+24,-20BR28B
D32U8L8ND2BU4L2R12L6BU4BR4U8D4L8
U4"
755 DATA"BR58BD34M-24,-20M+24,+2
0M-30,+4M+30,-4M-16,+25"
760 REM FIVE SEVENTHS
765 DATA"BR58BD34NU28M+30,+4M-30
,-4M+24,-20BR28B32U8L8ND2BU4L2R
12L6BU4L4R8U4L8U4R8"
770 DATA"BR58BD34M-24,-20M+24,+2
0M-30,+4M+30,-4M-16,+25M+16,-25M
+16,+25"
775 REM SIX SEVENTHS
780 DATA"BR58BD34NU28M+24,-20BR2
88D32U8L8ND2BU4L2R12L6BU4NL4R4U4
L8ND4U4R8"
785 DATA"BR58BD34M-24,-20M+24,+2
0M-30,+4M+30,-4M-16,+25M+16,-25M
+16,+25M-16,-25M+30,+4"
790 REM SEVEN SEVENTHS
795 DATA"BR"
800 DATA"BR58BD34NU28M-24,-20M+2
4,+20M-30,+4M+30,-4M-16,+25M+16,
-25M+16,+25M-16,-25M+30,+4M-30,-
4M+24,-20BR28B32C0U8L8ND2BU4L2R
12L6BU4BR4U8L8D2"
805 REM ONE EIGHTH
810 DATA"BR58BD34NU28ND28NL32NR3
2NE22NF22NG22NH22BR44BD12NU4R8U8
D4L8U4NR8BU4L2R12L6BU4U8"
815 DATA"BR"
820 REM TWO EIGHTHS
825 DATA"BR58BD34NU28ND28NL32NR3
2NE22NF22NG22BR44BD12NU4R8U8D4L8
U4NR8BU4L2R12L6BU4R4L8U4R8U4L8"
830 DATA"BR58BD34NH22"
835 REM THREE EIGHTHS
840 DATA"BR58BD34NU28ND28NR32NE2
2NF22NG22BR44BD12NU4R8U8D4L8U4NR
88U4L2R12L6BU4L4R8U4NL8U4L8"
845 DATA"BR58BD34NH22NL32"
850 REM FOUR EIGHTHS
855 DATA"BR58BD34NU28ND28NR32NE2
2NF22BR44BD12NU4R8U8D4L8U4NR8BU4
L2R12L6BU4BR4U8D4L8U4"
860 DATA"BR58BD34NH22NL32NG22"
865 REM FIVE EIGHTHS
870 DATA"BR58BD34NU28NR32NE22NF2
2BR44BD12NU4R8U8D4L8U4NR8BU4L2R1
2L6BU4L4R8U4L8U4R8"
875 DATA"BR58BD34NH22NL32NG22ND2
8"
880 REM SIX EIGHTHS
885 DATA"BR58BD34NU28NR32NE22BR4
4BD12NU4R8U8D4L8U4NR8BU4L2R12L6B
U4L4NU4R8U4L8U4R8"
890 DATA"BR58BD34NH22NL32NG22ND2
8NF22"
895 REM SEVEN EIGHTHS
900 DATA"BR58BD34NU28NE22BR44BD1
2NU4R8U8D4L8U4NR8BU4L2R12L6BU4BR
4U8L8D2"
905 DATA"BR58BD34NH22NL32NG22ND2
8NF22NR32"
910 REM EIGHT EIGHTHS
915 DATA"BR"
920 DATA"BR58BD34NU28ND28NL32NR3
2NE22NF22NG22NH22BR44BD12C0NU4R8
U8D4L8U4NR8BU4L2R12L6BU4L4R8U4NL
8U4L8D8"
925 REM ONE NINTH

```

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```

1075 DATA .143,.286,.429,.571,.7
14,.857,1
1080 DATA .125,.25,.375,.5,.625,
.75,.875,1
1085 DATA .111,.222,.333,.444,.5
56,.667,.778,.889,1
1090 CLS:PRINT:PRINT:PRINT
1095 PRINTTAB(3)"PROBLEMS COMPLE

```

```

TED = "NC+NW:PRINT
1100 PRINTTAB(3)"CORRECT RESPON
ES = "NC:PRINT
1105 PRINTTAB(3)"INCORRECT RESPO
NSES = "NW:PRINT
1110 TR=NC+NW:IFTR=0THENTR=1
1115 SC=INT(NC/TR*100)
1120 PRINTTAB(3)"YOUR TOTAL SCOR

```

```

E = "SC%":PRINT
1125 PRINTTAB(3)"ANOTHER TRY (Y/
N) OR (C) ?":
1130 X$=INKEY$:IFX$=""THEN1130
1135 IFX$="Y"THEN RUN
1140 IFX$="N"THEN CLS:END
1145 IFX$="C"THEN 200
1150 GOT01130

```

Novices Niche

Graphics

CoCo 3

Coloring

by Phil Elliott, Jr.

Coloring is an HSCREEN program for the CoCo 3. Instructions are displayed when you run the program. *Coloring* draws overlapping boxes and circles on the screen. You can color and paint the randomly created shapes with the specified key commands. There are 16 colors from which to choose. See if you can create familiar images by coloring the given shapes. Most of all, have fun!

The Listing: COLORING

```

0 'COLORING
  WRITTEN BY PHIL ELLIOTT, JR.
  COPYRIGHT (C) JANUARY 1990
  BY FALSOFT, INC.
1 ONBRKGOTO29:POKE65497,0:GOSUB2
5
2 HSCREEN2:PALETTE0,0:HCLS0:GOSU
B21:HCOLOR15:FORX=1TO20:BX=RND(-
TIMER):IFRND(2)=1THENELSE4
3 A=RND(320)-1:B=RND(192)-1:A1=R
ND(320)-1:B1=RND(192)-1:HLINE(A,
B)-(A1,B1),PSET,B:GOT05
4 A=RND(320)-1:B=RND(192)-1:R=R
N(100):HCIRCLE(A,B),R
5 NEXT:HCOLOR0:HLINE(0,180)-(319
,191),PSET,B:HCOLOR15:HLINE(0,0)
-(319,180),PSET,B
6 S=0:FORX=0TO15:HCOLORX:HLINE(S
,184)-(S+15,191),PSET,B:S=S+20:
NEXT:C=4:HCOLORC:HLINE(C*20,184)
-(C*20+15,191),PSET,B:X=160;Y=96
:ZZ$=INKEY$
7 AN$=INKEY$:IFAN$=CHR$(103)THEN
9ELSEIFAN$=CHR$(4)THEN10ELSEIFAN
$=CHR$(94)ORAN$=CHR$(95)THEN11EL

```

```

SEIFAN$=CHR$(10)ORAN$=CHR$(91)TH
EN13ELSEIFAN$=CHR$(8)ORAN$=CHR$(
21)THEN15ELSEIFAN$=CHR$(9)ORAN$=
CHR$(93)THEN17ELSEIFAN$=CHR$(13)
THEN19
8 IFAN$="Q"THEN29ELSEIFAN$=" "TH
EN20ELSEGOSUB23:GOT07
9 IFC=0THEN7ELSEC=C-1:OS=1:GOSUB
22:GOT07
10 IFC=15THEN7ELSEC=C+1:OS=-1:GO
SUB22:GOT07
11 IFAN$=CHR$(95)THENELSEIFY=0TH
EN7ELSEY=Y-1:GOT07
12 IFY<10THEN7ELSEY=Y-10:GOT07
13 IFAN$=CHR$(91)THENELSEIFY=180
THEN7ELSEY=Y+1:GOT07
14 IFY>170THEN7ELSEY=Y+10:GOT07
15 IFAN$=CHR$(21)THENELSEIFX=0TH
EN7ELSEX=X-1:GOT07
16 IFX<10THEN7ELSEX=X-10:GOT07
17 IFAN$=CHR$(93)THENELSEIFX=319
THEN7ELSEX=X+1:GOT07
18 IFX>309THEN7ELSEX=X+10:GOT07
19 HPAINT(X,Y),C,15:GOT07
20 PALETTERRND(15),RND(64)-1:FOD
E=1TO50:NEXT:IFINKEY$=""THEN20EL
SECMP:GOSUB21:PALETTE0,0:GOT07
21 RESTORE:FORW=80TO15:READA:PALE
TTEW,A:NEXT:RETURN:DATA5,9,16,4,
26,44,21,32
22 HCOLOR0:HLINE((C+OS)*20,184)-
((C+OS)*20+15,191),PSET,B:HCOLOR
4:HLINE(C*20,184)-(C*20+15,191),
PSET,B:RETURN
23 P-HPOINT(X,Y):IFP=0THENK=4ELS
EK=0
24 HSET(X,Y,K):FORDE=1TO50:NEXT:
HSET(X,Y,P):FORDE=1TO50:NEXT:RET
URN
25 WIDTH40:CMPT:ATTR2,0:CLS1:PRIN
T:PRINTTAB(14)::ATTR2,0,U:PRINT"
INSTRUCTIONS"::ATTR2,0:PRINT:PRI

```

NT
26 PRINT" USE THE ARROW KEYS TO MOVE THE CURSOR (THE SMALL DOT) ONE PIXEL AT A TIME. PRESS <SHIFT><ARROW KEY> TO MOVE CURSOR 10 PIXELS AT A TIME."
27 PRINT:PRINT" USE F1 TO MOVE COLOR BOX TO THE LEFT OR F2 TO MOVE IT TO THE RIGHT.":PRINT:PRINT" HIT ENTER TO PAINT THE AREA WHERE THE CURSOR IS LOCATED WITH THE CURRENT COLOR."
28 PRINT:PRINT" HIT SPACE BAR TO BEGIN COLOR CYCLING. HIT ANY OTHER KEY TO RETURN TO NORMAL.":PRINT:PRINT" PRESS Q TO QUIT":PRINT:PRINT" HIT ENTER TO BEGIN":Z
Z\$=INKEY\$:EXEC44539:RETURN
29 CMP:CLS1:POKE65496,0

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00	Utilities	\$2.95	<input type="checkbox"/>	MAR 00	Business	\$2.95	<input type="checkbox"/>	APR 00	Graphics	\$2.95	<input type="checkbox"/>	NOV 00	Business	\$2.95	<input type="checkbox"/>	DEC 00	Beginners	\$2.95	<input type="checkbox"/>	JAN 01	Anniversary	\$2.95	<input type="checkbox"/>	FEB 01	Utilities	\$2.95	<input type="checkbox"/>	MAR 01	Business	\$2.95	<input type="checkbox"/>	APR 01	Graphics	\$2.95	<input type="checkbox"/>	NOV 01	Business	\$2.95	<input type="checkbox"/>	DEC 01	Beginners	\$2.95	<input type="checkbox"/>	JAN 02	Anniversary	\$2.95	<input type="checkbox"/>	FEB 02	Utilities	\$2.95	<input type="checkbox"/>	MAR 02	Business	\$2.95	<input type="checkbox"/>	APR 02	Graphics	\$2.95	<input type="checkbox"/>	NOV 02	Business	\$2.95	<input type="checkbox"/>	DEC 02	Beginners	\$2.95	<input type="checkbox"/>	JAN 03	Anniversary	\$2.95	<input type="checkbox"/>	FEB 03	Utilities	\$2.95	<input type="checkbox"/>	MAR 03	Business	\$2.95	<input type="checkbox"/>	APR 03	Graphics	\$2.95	<input type="checkbox"/>	NOV 03	Business	\$2.95	<input type="checkbox"/>	DEC 03	Beginners	\$2.95	<input type="checkbox"/>	JAN 04	Anniversary	\$2.95	<input type="checkbox"/>	FEB 04	Utilities	\$2.95	<input type="checkbox"/>	MAR 04	Business	\$2.95	<input type="checkbox"/>	APR 04	Graphics	\$2.95	<input type="checkbox"/>	NOV 04	Business	\$2.95	<input type="checkbox"/>	DEC 04	Beginners	\$2.95	<input type="checkbox"/>	JAN 05	Anniversary	\$2.95	<input type="checkbox"/>	FEB 05	Utilities	\$2.95	<input type="checkbox"/>	MAR 05	Business	\$2.95	<input type="checkbox"/>	APR 05	Graphics	\$2.95	<input type="checkbox"/>	NOV 05	Business	\$2.95	<input type="checkbox"/>	DEC 05	Beginners	\$2.95	<input type="checkbox"/>	JAN 06	Anniversary	\$2.95	<input type="checkbox"/>	FEB 06	Utilities	\$2.95	<input type="checkbox"/>	MAR 06	Business	\$2.95	<input type="checkbox"/>	APR 06	Graphics	\$2.95	<input type="checkbox"/>	NOV 06	Business	\$2.95	<input type="checkbox"/>	DEC 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10	Utilities	\$2.95	<input type="checkbox"/>	MAR 10	Business	\$2.95	<input type="checkbox"/>	APR 10	Graphics	\$2.95	<input type="checkbox"/>	NOV 10	Business	\$2.95	<input type="checkbox"/>	DEC 10	Beginners	\$2.95	<input type="checkbox"/>	JAN 11	Anniversary	\$2.95	<input type="checkbox"/>	FEB 11	Utilities	\$2.95	<input type="checkbox"/>	MAR 11	Business	\$2.95	<input type="checkbox"/>	APR 11	Graphics	\$2.95	<input type="checkbox"/>	NOV 11	Business	\$2.95	<input type="checkbox"/>	DEC 11	Beginners	\$2.95	<input type="checkbox"/>	JAN 12	Anniversary	\$2.95	<input type="checkbox"/>	FEB 12	Utilities	\$2.95	<input type="checkbox"/>	MAR 12	Business	\$2.95	<input type="checkbox"/>	APR 12	Graphics	\$2.95	<input type="checkbox"/>	NOV 12	Business	\$2.95	<input type="checkbox"/>	DEC 12	Beginners	\$2.95	<input type="checkbox"/>	JAN 13	Anniversary	\$2.95	<input type="checkbox"/>	FEB 13	Utilities	\$2.95	<input type="checkbox"/>	MAR 13	Business	\$2.95	<input type="checkbox"/>	APR 13	Graphics	\$2.95	<input type="checkbox"/>	NOV 13	Business	\$2.95	<input type="checkbox"/>	DEC 13	Beginners	\$2.95	<input type="checkbox"/>	JAN 14	Anniversary	\$2.95	<input type="checkbox"/>	FEB 14	Utilities	\$2.95	<input type="checkbox"/>	MAR 14	Business	\$2.95	<input type="checkbox"/>	APR 14	Graphics	\$2.95	<input type="checkbox"/>	NOV 14	Business	\$2.95	<input type="checkbox"/>	DEC 14	Beginners	\$2.95	<input type="checkbox"/>	JAN 15	Anniversary	\$2.95	<input type="checkbox"/>	FEB 15	Utilities	\$2.95	<input type="checkbox"/>	MAR 15	Business	\$2.95	<input type="checkbox"/>	APR 15	Graphics	\$2.95	<input type="checkbox"/>	NOV 15	Business	\$2.95	<input type="checkbox"/>	DEC 15	Beginners	\$2.95	<input type="checkbox"/>	JAN 16	Anniversary	\$2.95	<input type="checkbox"/>	FEB 16	Utilities	\$2.95	<input type="checkbox"/>	MAR 16	Business	\$2.95	<input type="checkbox"/>	APR 16	Graphics	\$2.95	<input type="checkbox"/>	NOV 16	Business	\$2.95	<input type="checkbox"/>	DEC 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20	Utilities	\$2.95	<input type="checkbox"/>	MAR 20	Business	\$2.95	<input type="checkbox"/>	APR 20	Graphics	\$2.95	<input type="checkbox"/>	NOV 20	Business	\$2.95	<input type="checkbox"/>	DEC 20	Beginners	\$2.95	<input type="checkbox"/>	JAN 21	Anniversary	\$2.95	<input type="checkbox"/>	FEB 21	Utilities	\$2.95	<input type="checkbox"/>	MAR 21	Business	\$2.95	<input type="checkbox"/>	APR 21	Graphics	\$2.95	<input type="checkbox"/>	NOV 21	Business	\$2.95	<input type="checkbox"/>	DEC 21	Beginners	\$2.95	<input type="checkbox"/>	JAN 22	Anniversary	\$2.95	<input type="checkbox"/>	FEB 22	Utilities	\$2.95	<input type="checkbox"/>	MAR 22	Business	\$2.95	<input type="checkbox"/>	APR 22	Graphics	\$2.95	<input type="checkbox"/>	NOV 22	Business	\$2.95	<input type="checkbox"/>	DEC 22	Beginners	\$2.95	<input type="checkbox"/>	JAN 23	Anniversary	\$2.95	<input type="checkbox"/>	FEB 23	Utilities	\$2.95	<input type="checkbox"/>	MAR 23	Business	\$2.95	<input type="checkbox"/>	APR 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26	Beginners	\$2.95	<input type="checkbox"/>	JAN 27	Anniversary	\$2.95	<input type="checkbox"/>	FEB 27	Utilities	\$2.95	<input type="checkbox"/>	MAR 27	Business	\$2.95	<input type="checkbox"/>	APR 27	Graphics	\$2.95	<input type="checkbox"/>	NOV 27	Business	\$2.95	<input type="checkbox"/>	DEC 27	Beginners	\$2.95	<input type="checkbox"/>	JAN 28	Anniversary	\$2.95	<input type="checkbox"/>	FEB 28	Utilities	\$2.95	<input type="checkbox"/>	MAR 28	Business	\$2.9

Basic Instructions

by Dale L.Puckett
Contributing Editor

Each January we get back to the basics and welcome a new group of potential OS-9 users, those who received a new CoCo 3 for Christmas. We'll take a fresh look at OS-9 and try to eliminate some of the initial apprehension surrounding the use of OS-9 by new users.

OS-9 has earned a bad reputation within the Color Computer community over the years because many people have insisted to newcomers that the operating system is hard to use and impossible to understand. This misconception is probably due to the tremendous computing power built into OS-9. In fact, the OS-9 command set is very similar to and as easily understood as its counterpart on MS-DOS machines.

Many options come with this power; options that give you an opportunity to make various choices. Unfortunately it is easy to become overwhelmed when faced with a command providing too many choices. If this happens you may lose sight of the fact that *no action* is always an option. A professional operating system like OS-9 almost always takes a popular default action if you decide not to make a choice on a command line. At the very least, most utilities print the proper command line and the options available if you feed it something undigestible.

We'll try to make your transition from the ROM-based BASIC language built into your Color Computer to OS-9 a smooth one by comparing several OS-9 commands to similar Disk BASIC commands you may

have already used. To do this, we'll tackle a few similar tasks with the two tools.

Fundamentals

Imagine you need to print a message on the Color Computer screen. With Disk

We'll take a fresh look at OS-9 and try to eliminate some of the initial apprehension.

BASIC, you can enter a simple command immediately after the computer has been turned on to perform this task. For example, entering

```
PRINT "HELLO, I'M A COLOR COMPUTER!"
```

makes the CoCo print the following:

```
HELLO, I'M A COLOR COMPUTER!
```

Disk BASIC is a language, and one of the verbs in that language is PRINT. Each time Disk BASIC sees the word PRINT it looks at the string of characters or variables following that word and prints it.

If you need to print the same line on your screen several times, you could type in a short program and run it.

```
10 FOR X=1 TO 10
```

```
20 PRINT "HELLO, I'M A COLOR COMPUTER!"  
30 NEXT X
```

BASIC09 is one of several computer languages that run under the OS-9 operating system. Using an advanced design, it compiles each line of your program into an intermediate code, or I-code, as you enter it. As a result BASIC09 can run your programs four to five times faster than Disk BASIC. Programs written in BASIC09 are much easier to read and understand since they do not require line numbers, and you can use long variable names that convey meaning. Reading a BASIC09 program can be compared to reading the solution to a problem written in English. For example:

```
FOR LINE:=1 TO 10  
PRINT "HELLO, I'M A COLOR COMPUTER!"  
NEXT LINE
```

When you run this program, BASIC09 produces the same results on your Color Computer screen as the Disk BASIC program above. If you needed a stand-alone program, you could write the same program using the C compiler that runs under OS-9:

```
main()  
{  
    int line;  
  
    for(line = 0; line != 10; line++)  
        printf("HELLO, I'M A COLOR COMPUTER!\n");  
}
```

Disk BASIC, BASIC09 and C are all languages. While the syntax of each language is a bit different, the resulting screen output in the examples above is the same. Each language lets you do the same job.

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OS-9 is *not* a language. Rather, it is an operating system. Its many utility commands let you perform various tasks. For example, the OS-9 echo utility lets you emulate the first Disk BASIC PRINT command line above. When you execute echo with the same parameters, it produces a similar output. Entering

echo HELLO, I'M A COLOR COMPUTER

at the OS9: prompt prints

HELLO, I'M A COLOR COMPUTER

Notice we did not put an exclamation point (!) in the command line. An exclamation point is a special character in an OS-9 command line — it is used to set up a command pipeline. We'll show you an example of a pipeline in just a bit.

A feature of many operating systems (including OS-9) is the *procedure file* (known as a batch file in another operating system).

A procedure file is a text file made up of commands. When you run such a file, the commands in it are executed just as if you had typed them directly. By repeating the above echo command line 10 times in a procedure file, you can simulate the Disk BASIC, BASIC09 and C programs above. However, since the OS-9 Shell, which executes procedure files, is not a complete programming language and does not include FOR ... NEXT loops, you will need to put the echo command in your procedure file 10 times.

```
build TenTimes
? load echo
? echo Hello, I'm A Color Computer
? echo Hello, I'm A Color Computer
? ...
? unlink echo
? press ENTER
```

Just type tentimes and press ENTER to execute the procedure file. The solution

above may not be elegant, but it works. It also illustrates the point that OS-9 is not really complicated. It is simply an alternative way to perform a job.

OS-9 Does Graphics!

OS-9 also lets you create graphics. To illustrate, we'll look at three ways to draw a box on the CoCo graphics screen. We'll use Disk BASIC first.

```
10 PMODE 1,1
20 PCLS
30 SCREEN 1,1
40 LINE (10,10)-(10,176),PSET
50 LINE (10,176)-(240,176),PSET
60 LINE (240,176)-(240,10),PSET
70 LINE (240,10)-(10,10),PSET
80 GOTO 80
```

Alternatively we could have replaced lines 40 through 70 with Line 40 below. But, we wanted to keep our example programs parallel.

CoCoPRO! was proud to announce the introduction of a new game from the illustrious **Steve Bjork**, at the Atlanta CoCoFEST! Although this game was written exclusively for Fest attendees, we are offering our last 100 copies for sale to those who couldn't join us!

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To draw the same box on a CoCo I or 2 with BASIC09 running under Level I, use:

```
run gfx("clear")
run gfx("color",7)
run gfx("move",16,16)
run gfx("line",16,176)
run gfx("line",240,176)
run gfx("line",240,16)
run gfx("line",16,16)
```

The above commands work on the graphics screen supported by OS-9 Level I. To run the sequence with OS-9 Level II windows on a Color Computer 3, use the line commands built into the handy *gfx2* module that comes with BASIC09. You can use the above *gfx* commands under OS-9 Level II, but you must be working in a *hardware* or Type I window. Note that when you work with OS-9 Level II's graphics windows, as opposed to text windows, the *grfint* module must be in your OS9Boot file. Never fear, stock OS-9 Level II comes built this way. If you have *Multi-Vue* and a little experience, you can gain better and more powerful access to graphics windows through the *windint* module supplied with *Multi-Vue*.

The *gfx* in the BASIC09 program lines above is the name of a BASIC09 module that interprets the high-level language parameters within parenthesis and sends the proper control codes to the OS-9 screen driver. The *move* command places OS-9's invisible graphics cursor at a position 16 pixels from the bottom of the screen and 16 pixels to the right of the screen's left edge.

The description of the *gfx* module above implies that you should be able to send these codes to the screen driver module from the OS-9 command line, which is true. In fact, an easy way to draw the box is to build a procedure file using the OS-9 *display* command.

```
build box
? load display
? display F 0 4
? display 10 4
? display 11 7
? display 15 10 10
? display 16 10 B0
? display 16 F0 B0
? display 16 F0 10
? display 16 10 10
? unlink display
? press ENTER
```

Again, because of the commands it uses, this procedure file must be used in a Type

I window. You can also type *display* followed by each of the hexadecimal numbers in one command line. In fact, it's much easier to do that way.

```
display F 0 4 10 4 11 7 15 10 10
16 10 B0 16 F0 B0 16 F0 10 16 10
10
```

We formatted the procedure file in such a way as to make it parallel in structure to the BASIC09 program. The line with *display 15 10 10* places the invisible cursor used by the OS-9 graphics driver 16 pixels up and 16 pixels to the right of the lower left corner of the OS-9 graphics screen just like the *move* command in the BASIC09 program. Notice also that the OS-9 *display* command uses hexadecimal numbers while the BASIC09 program used decimal numbers. Location *B0* is 176 pixels up from the bottom of the screen. Location *F0* is 240 pixels to the right of the left edge of the screen. Notice how these numbers compare to the decimal numbers in the BASIC09 and Disk BASIC programs.

You can also use the OS-9 *display* utility with the proper control codes to move the graphics cursor, set individual pixels on the screen to a specific color, draw circles and paint an area of the screen with a specific color. While running under OS-9 Level II, you can even use them to open and close windows, create menus, and more.

Since you now understand that OS-9 is merely another way to give directions to your CoCo, we'll show you how to get started using OS-9. Hopefully, we can steer you past a few trouble spots along the way.

OS-9 is an Operating System

Before moving on, we should take a few moments to talk about operating systems. In the language of a systems designer, an operating system controls the low-level processes within your computer. It gives applications programs a way to talk with and control your hardware. It also manages the memory and other finite resources within your computer.

These *processes* are nothing more than short programs that run and perform important jobs for you. These jobs may include putting characters in a disk file or sending a series of characters to a printer. Your system resources include external devices like your terminal, printer and disk drives. They also include objects inside your computer like memory and the microprocessor's time.

Think of an operating system as a traffic cop on a busy corner. The traffic cop directs the flow of automobiles on a busy street.

OS-9 directs the flow of information inside your computer, making sure that the right data gets to the right place at the right time.

Getting Started with OS-9

To bring OS-9 to life on your Color Computer, insert your OS-9 master disk in Drive 0 and enter DOS. DOS is a Disk BASIC command that loads the OS-9 Kernel and starts the system.

Soon after you enter DOS, OS-9 asks you to tell it the date and time. (Add one of the many hardware clocks to your CoCo, if you have not already done so.) OS-9 uses the date and time to record when it saves a file. *setime*, the OS-9 utility that asked you for the time, must be run each time you start OS-9. This program starts the software clock that runs within OS-9. If this clock is not running, OS-9 will not be able to run multiple tasks. If you want to know the current date while running OS-9, ask for it by using the *date* utility that comes with the system. Simply type *date* and press **ENTER**. OS-9 will print the date on your screen. If you also need to know the time, ask OS-9 to print it, too, by adding the *t* option. Enter *date t*.

If you type this command right after you start the system, OS-9 looks in its *module directory* (a fancy phrase for *memory*) for a module named *date*. Since you haven't loaded that module, OS-9 will not find it. But OS-9 knows other places to look — it now looks for *date* in its current execution directory (almost always */dd/CMDS* on standard OS-9 systems). If you haven't deleted the *date* command from your disk, OS-9 will find it, load it into memory and execute it — it does this behind the scenes and in just a few seconds. All you see is the *date* appear on the screen.

If you know you are going to use *date* several times in a session, load it into memory by entering *load date*. After this, it will appear to run instantly. In fact, you can load a number of program modules into memory and have them instantly available. But, if you try to load too many programs into the crowded 64K work space, you quickly run into problems. There won't be enough memory in your computer to run the large programs that conduct most of your real work. For example, BASIC09 takes up approximately 22K of memory. This means you have to write programs in a number of small modules, loading each module from a disk when needed. The modular structure of BASIC09 is a big plus, but loading a module from disk every time it's needed can be a big pain.

OS-9 Level II and Memory Problems

If you own a 512K CoCo 3, OS-9 Level II

will make your life much easier. It solves many of your memory problems by setting up a separate 64K of work space for each task running on the computer. Let's briefly compare OS-9 Level I and OS-9 Level II.

OS-9 Level I provides no memory management function beyond the 6809E processor's 64K address space. This limits your access to the 64K maximum.

OS-9 Level II works with two different types of work space. It sets aside a system work space that holds all of the device descriptors and device drivers that control the hardware, as well as the file managers, Kernel and other internals to manage your computer's resources. That same system work space is used for all of the data memory needed by OS-9.

After setting up its own system work space, OS-9 Level II sets up a separate work space for each process. Remember, a process is simply a running program. Each of these "user" work spaces can be up to 64K long.

When you run BASIC09 on your CoCo under OS-9 Level I, memory space is cramped and you have very little room for your own programs. For example, on my older Level I system I have 145 pages or just over 36K of free memory immediately after OS-9 starts.

After BASIC09 is loaded, there are only 55 left (just over 13K). That doesn't leave much space to work.

Now, let's see what happens when you run BASIC09 with OS-9 Level II. After BASIC09 is loaded, it just sits in memory. It will be available almost immediately, but it won't be using any data work space until you start it as a process by running it from the command line. When you do this, you have nearly 64K available for it and its programs. This means BASIC09 is able to use almost 64K, 22K for itself and nearly 42K for its programs and data. Actually, there is closer to 63.5K available in each workspace since the top 512 memory locations are mapped to the hardware.

Making a New OS-9 Disk

One of the most important lessons when first working with OS-9 is to always work with a copy of the master disk from Tandy. Never work with the original disk. Accidents happen, even to experienced hackers.

Make a backup of your master disk the first time you run OS-9. It isn't difficult and shouldn't take much time. Think of it as an investment.

First, you will need to format a new disk. Enter load format free to load format and

free into memory. Now, take the OS-9 System Master disk out of Drive /d0 and insert the new disk. Type format /d0 and press ENTER. format asks you if you really want to format the disk in Drive /d0. After you confirm that the disk in Drive /d0 is indeed your new disk and not your System Master disk, press Y for Yes and the program goes to work.

You are then asked to name the new disk. You can make up any name since that name will be replaced when you backup the System Master disk on the new disk. After you enter the name, format verifies the data placed on the new disk.

When you see the OS9: prompt again, enter free /d0. The free command should report that a total of 630 sectors are on the disk and 620 sectors are available for use. If format finds any bad sectors on the new disk, it locks them out, and free reports a number smaller than 630. If this happens, do not attempt to backup your System Master disk to the new disk. The OS-9 backup utility requires that the format of the new disk be exactly like the original disk. If the two formats are not identical, backup will not work.

If your new disk is good, remove it and put the System Master disk back in /d0.

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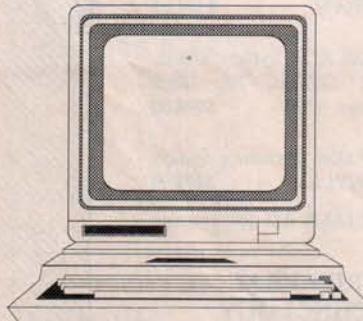
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SELECTIONS

Enter `unlink` format free to remove format and free from memory. Now enter `load backup` to load the backup command into memory. After the command has loaded, take the original master disk out of the drive and put in the newly formatted disk. Then enter:

```
backup -s /d0 #32K
```

When you are asked if you are ready to backup from `/d0` to `/d0`, press Y for Yes. The program then instructs you to put the destination disk in the drive and press any key. OS-9 then asks if it is all right to write over (scratch) the disk mounted in the drive. Again, press Y for Yes.

You'll then be asked to get the source disk ready. Remove the new disk from Drive `/d0`, insert the System Master disk and press any key. You will have to repeat this several times, swapping the disks until the original disk is completely copied to the new disk. If you have two disk drives in your system, you will be able to run backup by putting the fresh disk in Drive `/d0`, the System Master in Drive `/d1` and entering:

```
backup #32K /d1 /d0
```

Now that you have a new copy of your system master disk, store the original in a safe place. The important thing to remember about backups is that you can only backup a disk to another disk of identical size. You cannot backup a 35-track disk to a 40-track drive. Nor can you backup a single-sided 40-track disk to a double-sided 40-track disk.

To backup all the files on a disk of one format onto a disk formatted differently, use the OS-9 `dsave` command. Here is a series of commands that will do the job:

```
chd /d1
dsave /d1 /d0 ! shell
```

Notice that these commands assume you have two disk drives. After you have used OS-9 a few hours, you will discover that two disk drives are pretty much a necessity and not a luxury. The exclamation point in the command line causes OS-9 to send the output of the `dsave` command to the command interpreter, which is named `shell`. This is an example of the pipelines mentioned earlier.

Customizing Your Disks

One of the most important advantages of OS-9 is that it allows you to customize your system. Unfortunately, this also makes a tremendous contribution to the myth that

OS-9 is difficult to use and understand.

Pledge to stick with the basics until you are ready to start modifying your system. Practice running the utility commands that are stored in the `/d0/CMD$` directory of your working system disk. Follow the directions in the OS-9 manuals and/or *The Complete RAINBOW Guide to OS-9*. After you understand what is happening with each command, move forward and modify your system.

Many of the problems encountered with OS-9 Level I revolve around the severe memory constraints forced by the limited 64K workspace. In fact, many of the error messages received happen because there is simply not enough free memory to load programs you want.

Another common error message for the beginner is Error 216, File Not Found. This error pops up for beginners since they do not fully understand the OS-9 file system.

The important thing to remember is that OS-9 always maintains two working directories. One of these directories is called the current execution directory. The other is called the current data (working) directory. OS-9 always looks in the current execution directory for the executable programs it needs. It usually stores all data files and looks for procedure files in the current data directory.

Here's the trick. The current execution directory and current data directory are seldom stored in the same physical position on two different disks. This means that even though these directories may have the same names on both disks, they are often not located on the same track or sector. Therefore, OS-9 may not be able to find your current directories if you swap the disk without telling it.

Here's the solution. If you remove one disk from a drive and insert another, type:

```
chd /d0/yourdirectory
chx /d0/cmds
```

Note that the directory names in the two command lines above are simply examples — you need to type the names of actual directories stored on the disk.

Hopefully, we have given you enough information to get you started with OS-9, and pointed out a few of the pitfalls. Hang in there and practice. Stick with the simple utilities until you thoroughly understand what is happening. After you conquer a command, move on to another. Soon, you'll be able to control your Color Computer with OS-9, and you won't feel like it's controlling you.

Until February, keep on hacking! ☺

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The C Zen Continues

by Greg Law
Technical Editor

The first stop on our journey is a tour of the *unbuffered I/O* functions, which are also referred to as *low-level I/O* functions. These functions are referred to as low-level since they pass arguments directly to the operating system without any intermediate steps. All of the low-level functions are described in Chapter 3 of the C Compiler Manual.

Before data can be written to or read from a file, the file must be created and/or opened. As demonstrated last month, an existing file is opened by calling `open()`, but this returns an error message if the file does not already exist. In this case, the file can be created by using `creat()`. Although both functions use the same parameters, there is one distinct difference between them. With `open()`, the access mode is specified. That is, to read and/or write data to the file. In the call to `creat()`, the file permission attributes are specified. The permission attributes are

<code>S_ISHARE</code>	Non-Sharable
<code>S_IEXEC</code>	Public Execute
<code>S_IWRITE</code>	Public Write
<code>S_IREAD</code>	Public Read
<code>S_IEXEC</code>	Owner Execute
<code>S_IWRITE</code>	Owner Write
<code>S_IREAD</code>	Owner Read

If a file is created with Owner Execute and/or Public Execute permission, it is created in the current execution directory.

In addition to being OS-9 Online SIGOP, Greg Law enjoys programming on all types of computers and has worked on systems ranging from the CoCo to the Burroughs B6700 super mainframe. He lives in Louisville, Kentucky.

To create a file with Owner Read and Owner Write permissions, use:

```
creat("datafile.dat", S_IREAD | S_IWRITE);
```

All of the legal access permissions are defined in the `modes.h` file and are listed on Page 3-11 of the C Compiler Manual. For example, assume we are writing an application that needs to rewrite an existing file or create a new one. As shown in Listing 1, this technique is actually quite simple. First, the program tries to open the file in write mode (`S_IWRITE`). If the file cannot be opened, the program attempts to create it with Owner Read (`S_IREAD`) and Owner Write (`S_IWRITE`) attributes. If the file cannot be opened or created, the program exits with an error. If all goes well, the file is

closed by calling the `close()` function and the program exits without an error.

Another method to determine the existence of a file is the `access()` function. This function works exactly like the `open()` function with one minor difference: `access()` attempts to open the file and returns a value to indicate success or failure. The file is closed if it was successfully opened and a value of 0 is returned. Otherwise a value of -1 is returned. An example of using `access()` is shown in Listing 2. If the file exists, it is opened using the `open()` function. Otherwise the program exits with an error. You would normally include the desired access mode to determine whether or not the attributes allow reading and/or writing data to the file. You can also use an access mode of zero to determine whether or not the file exists at all.

OS-9

Listing 1: test_1.c

```
/* BreakPoint
 * Written by Greg Law
 * Published January 1991
 */

#include <modes.h>
#include <stdio.h>

main()
{
    int path;

    if((path = open("datafile.dat", S_IWRITE)) == -1)
        if((path = creat("datafile.dat", S_IREAD | S_IWRITE)) == -1)
            exit(errno);

    close(path);
}
```

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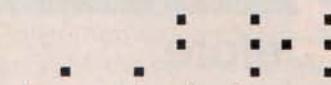
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One commonly asked question is on the use of `access()` as opposed to simply creating or opening the file. Indeed, using `access()` may seem redundant in most cases. For example, if you are writing a terminal program with the Xmodem file transfer protocol it should be obvious that you don't want to overwrite existing files. Examine Listing 3 as I describe the actions taken by the program.

Before
data can be
written to or
read from a
file, the file
must be
created and/
or opened.

The three integer variables are used to hold the status returned from `access()`, the path number of the newly created file and the length of the filename. The two character arrays are used to store the filename and an odd-looking thing I call an extension. The brunt of the work is performed by the `while` loop. It first checks to see if the file exists. If the file exists, the original filename is restored by terminating it with a null character and an extension is concatenated onto the chosen filename. Finally the character used for the extension is incremented and the loop checks to see if this new filename exists.

Notice that in the first pass through the loop, the program checks the existence of a file named `datafile.dat`. In the second pass through the loop, the filename is changed to `datafile.dat_a` and then to `datafile.dat_b` in the third pass through the loop. This process continues until the filename finally reaches `datafile.dat_z`. If all 27 files exist, the `exit()` function is called to terminate the program. Feel free to modify and use this routine as you choose. □

Listing 2: test_2.c

```
/* Breakpoint
 * Written by Greg Law
 * Published January 1991
 */
#include <modes.h>
#include <stdio.h>

main()
{
    int status;
    int path;

    if((status = access("datafile.dat", S_IREAD | S_IWRITE)) != -1)
        path = open("datafile.dat", S_IREAD | S_IWRITE);
    else
        exit(errno);

    close(path);
}
```

Listing 3: test_3.c

```
/* BreakPoint
 * Written by Greg Law
 * Published January 1991
 */
#include <modes.h>
#include <stdio.h>
#include <string.h>

main()
{
    int status;
    int path;
    int length;
    char filename[29];
    char extension[3];

    strcpy(filename, "datafile.dat");
    strcpy(extension, "_a");
    length = strlen(filename);

    while((status = access(filename, 0)) != -1)
    {
        filename[length] = '\0';
        strcat(filename, extension);

        printf("Attempting <%s>\n", filename);

        if((extension[1]++) > 'z')
            exit(0);
    }

    path = creat(filename, S_IREAD | S_IWRITE);
    close(path);
}
```

Novices Niche

Directory Alphabetizer

by Shawn M. Davis

Directory Alphabetizer arranges all filenames in a disk directory in alphabetical order. The program is very easy to use. First, type in the listing and save it as DIRECTOR. Next, enter RUN"DIRECTOR". When the program prompts you, put the disk to be sorted in Drive 0 and press ENTER. When the sort is finished, you are asked if you want to sort another disk. Simply press Y for Yes or N for No.

The Listing: DIRALPHA

The program is easy to follow. The title screen and instructions are printed from lines 20 to 40. Lines 50 to 110 read into memory a sector from the disk directory. Line 70 checks if the sector is empty. If it is, control is passed to Line 120, otherwise the filenames are placed in an array for alphabetizing. Next, lines 120 to 160 remove all filenames that have been killed, this is necessary for alphabetiza-

tion. Lines 170 to 260 actually alphabetize the array of filenames. The alphabetized filenames are then placed back on the disk in lines 270 to 350. And finally, the program asks if another disk is to be alphabetized, waits for a response, and does the appropriate function in lines 360 to 410.

```

90 P$(M+P/32)=MID$(A$,P,32)
100 P$(M+4+P/32)=MID$(B$,P,32)
110 NEXT P: M=M+8: NEXT S
120 M=M-1:PRINT:PRINT TAB(6)"ALL
KILLED FILENAMES":PRINT TAB(7)""
ARE BEING REMOVED."
130 FOR P=1 TO M
140 IF ASC(MID$(P$(P),1,1))<>0 T
HEN 160
150 P$(P)=STRING$(32,255)
160 NEXT P
170 PRINT:PRINT" NOW ALPHABETIZI
NG. PLEASE WAIT"
180 LET S = M-1
190 IF S=0 THEN 260
200 FOR P = 1 TO S
210 IF P$(P) < P$(P+1) THEN 250
220 H$ = P$(P)
230 P$(P) = P$(P+1)
240 P$(P+1) = H$
250 NEXT P: S= S-1:GOTO190
260 FOR I=5 TO 14:PRINT@I*32,STRI
NGS(32,32)::NEXT I
270 PRINT@160," THE NEW DIREC
TORY CAN NOW":PRINT TAB(6)"BE ST

```

```

ORED ON THE DISK"
280 S=3:FOR P =1 TO M STEP 8
290 A$="" :B$=""
300 FOR N= 0 TO 3
310 A$=A$+P$(P+N): B$=B$+P$(P+4+N)
320 NEXT N
330 DSK0$ 0,17,S,A$,B$
340 S= S+1: NEXT P
350 PRINT:PRINT TAB(5)"THE PROCE
SS IS COMPLETE"
360 PRINT:PRINT" WOULD YOU LIKE
TO ALPHABETIZE":PRINT" ANOT
HER DISK DIRECTORY?":PRINT TAB(8)
"(TYPE 'Y' FOR YES OR":PRINT TAB
(8)"TYPE 'N' FOR NO"
370 K$ = INKEY$: IFK$="" THEN 370
380 IFK$ ="Y" THEN 10
390 IFK$<>"N" THEN 370
400 CLS:PRINT" THE PROGRAM
HAS BEEN":PRINT" TERMINATED.
TYPE 'RUN' TO":PRINT TAB(12)"CON
TINUE"
410 END

```

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Best Timing for 512K

by Marty Goodman
Contributing Editor

I just purchased the Disto 512K upgrade board for my CoCo 3. The installation instructions that came with it recommend clipping two capacitors. You seemed to imply in your RAINBOW column of March 1989 that the Hemphill mod (adding a 47-ohm resistor in parallel with R22) is better and would make the DRAM chips run cooler. Can I use the Hemphill mod with my Disto memory board?

Thomas W. Fann (TOMFANN)
Akron, Ohio

You can try using the Hemphill mod with the Disto or any other memory board. I should clarify, however, that I had reports and not actual personal data on the value of the Hemphill mod. Honestly, my own two 512K CoCo 3s have the clipped capacitor mod and seem to work quite well. The DRAMs are warm to the touch, but not broiling hot. I suggest you just try one timing fix. If you run into problems such as excessive heat on the DRAM chips or too many sparkles on the screen, try the other and see if matters improve. A lot may depend on differences between timing parameters of various brands of DRAM chips you might put in the upgrade.

Switch-Hitting Monitor

How would I change my Magnavox ICM135 monitor to allow convenient switch-

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

ing between the analog and TTL inputs? I want to have my CGA video and CoCo analog video connected to a switch box so I can easily switch the monitor between the two machines.

Dave Robling (IARMBANDIT)
Mills, Wyoming

A device to accomplish what you want would involve very tedious modification inside the monitor, as well as construction of a multiple switch box. Not only do you need to switch the seven separate video lines at the input, but the monitor itself must be switched between its analog and TTL mode. You would have to go inside the monitor and externalize whatever is connected to the TTL/Analog switch. All of this would take a lot of time, effort and the use of either a switch with many poles or a bunch of relays. Practically speaking, I doubt it would be worth all that trouble.

In Search of Soldering Irons

Can you recommend a soldering iron to me? Can you suggest how I might fix a modem in which the 5-volt regulator and heat sink get so hot they often appear to cook other nearby chips causing the modem to seize up after about an hour of use?

Phillip Brown (THEFERRET)
Berkeley, California

I use old Weller WCTPN solder stations. These sold new for over \$100, but I picked mine up for \$20 each, or less, at ham and other electronics flea markets. Such bargain purchases usually require repair, but repairs on these items are extremely easy to make. The design is very simple and straightforward. Weller is also very good about supplying service information and whatever parts you need at rather reasonable prices. These temperature-regulated, 60-watt units heat quickly and have lots of reserve power for tough jobs. For most of my fine

work I use the Weller PTR-7 tip. This is a screwdriver shaped tip that is $1/32$ " wide and heats to 750 Fahrenheit. Also consider Radio Shack's "build your own" soldering iron. Specifically, purchase catalog numbers 64-2080 (handle), 64-2081 (700-Fahrenheit heating unit) and one or more of their collections of tips for the same (64-2089, 64-2074, 64-2084). This system is, I believe, actually made by Ungar. Parts for it are probably not only available through Radio Shack, but through suppliers of Ungar soldering equipment as well. Radio Shack's prices are quite reasonable. Several of my friends have used this system and reported it works well for them.

As for your modem, I have fixed similar problems by removing the 5-volt regulator and placing it in a separate box with a heat sink on it. This results in the heat being dissipated outside the modem box where it doesn't affect other nearby chips. [Ed. Note: Marty notes that when this repair was attempted, the modem still had problems, apparently due to other regulators in the area or a flaky VLSI modem chip.]

File Comparisons

Is there a Compare program that compares two copies of a disk file byte-for-byte to see if they are identical? I ask because I am concerned about possible viruses or worms.

Lorin E. Owens
Bakersfield, California

Many years ago Don Hutchison wrote a Disk Compare program. I believe a copy of it is posted in the Utilities section of the Delphi CoCo SIG. This program compared every byte of one file to another with the proviso that the files had to be binary program files and one had to reside in memory during the comparison. However, I would not worry about CoCo viruses or worms. There has never been a report of a CoCo Disk BASIC virus. In theory one could be

made, but it is awfully difficult to do and would be easily thwarted; a BACKUP command would cleanse any infected disks. An OS-9 virus is more likely, though to date there have been no such reports.

Cassette Port Dissected

I use BASIC09 and assembly language, and want to use the cassette port on the CoCo 3 to communicate with the outside world. Can you help me with the addresses for that port?

Nyle A. Tack (BTACK)
Peralta, New Mexico

Fully using the cassette port may be more difficult than you think. The 5-pin port consists of a relay-controlled switch (cassette-motor relay), a zero-crossing detector input and a 6-bit digital-to-analog converter output. Under Radio Shack BASIC, the relay is used to switch the cassette motor on and off. The zero-crossing detector is used in conjunction with appropriate

assembly-language software to detect the frequency and duration of an incoming cassette tone. The D-to-A converter is used, again in conjunction with ML software, to generate tones of specific types. All of these are controlled by a 6821 PIA chip, which is addressed internally in the CoCo from \$FF20 through \$FF23.

The cassette-motor switch is easy to use. Pins 1 and 3 of the cassette port are hooked to SPST relay contacts. The relay is controlled by the CA2 line of the PIA. This is mapped to Bit 3 of the control word at \$FF23. If bits 4 and 5 of \$FF23 are set to 1 (High), Bit 3 of \$FF23 can be used to control the cassette motor by writing a 0 or 1 to it. See the Motorola data sheet for the 6821 chip for details on control of the CA2 line.

The zero-crossing detector is fed by Pin 5 of the cassette port. If a zero crossing is detected, Bit 0 of the PA0 port of the PIA (mapped to \$FF20) is affected. Of course, that bit must be programmed as an input via the appropriate technique involving the

control word at \$FF21. Again, see the data sheet for the Motorola 6821 for details.

The D-to-A converter sends its output to Pin 4 of the cassette port. Pin 2 is ground. The voltage fed to Pin 4 is affected by the value written into bits 2 through 7 at port PA0 (address \$FF20). Again, those bits must be programmed as inputs first.

Unfortunately, OS-9 is a uniquely rotten environment for using either the zero-crossing detector or the A-to-D converter to recognize and generate tones. This is due to the fact that such ports require constant attention by software, which is something OS-9 is unable to do. However, you should have no trouble using the CoCo's cassette-motor relay under OS-9. If you are switching high voltages or a large current, you should add a second relay in cascade that is rated for the voltages and currents you want to switch.

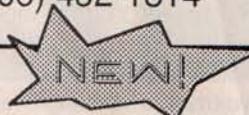
If you plan to pursue this matter, it is almost essential to have the data sheet for the Motorola 6821 chip and the full service



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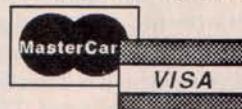
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Deluxe 512K booster kit (Upgrades 256K board to 512K, w/chips)	\$64.95
Bare 512K booster kit (Same as DELUXE, but no memory chips)	\$29.95

manual for the CoCo 3. The latter provides not only the CoCo 3's schematic, but also diagrams of the innards of two custom I/O chips in the CoCo 3, which are critical to understanding the cassette input.

To further pursue use of the available possibilities on the CoCo, I highly recommend Bill Barden's new book, *Connecting the CoCo to the Real World*.

Get a Boot out of DOS

How do I use the DOS command to achieve auto-execution of a program?

Alexi D. Papaleonardos (WTHUNDER)
Columbus, Ohio

The DOS command causes the CoCo to load all data on Track 34 of the disk into memory starting at Location \$2600. The CoCo then examines the contents of \$2600 and \$2601, which are the first two bytes of the first sector of Track 34. If it finds \$2600 to contain the ASCII code for O and \$2601 to contain the ASCII code for S, it then proceeds to execute the code it finds starting at location \$2602. If it does not find OS in \$2600 and \$2601, program control is returned to BASIC. You must make the first two bytes of sector 1 of Track 34 be \$4F and \$53. Follow that with whatever machine-language loader program you want to start your code. Note that your loader program will probably involve code that loads other sectors from the disk using the DSKCON routine in BASIC or your own DSKCON-like routine in Track 34. You'll also need to lock Track 34 out of use via the granule allocation table to prevent that track from being overwritten. For more information, see Roger Schrag's "A Special Use for the DOS Command" (Rainbow, November 1984, Page 140).

High-Speed Bit-Banger

Is there any way to use the timer and serial-port interrupt lines in the CoCo 3 to make a bit-banger device driver for OS-9 that would allow use of the bit-banger port with a modem at speeds of 1200 baud or higher?

Jason Bucata (JBUCATA)
Ferndale, Michigan

One problem is the serial-port input interrupt is incorrectly wired on the CoCo 3. It triggers on the wrong edge of the incoming signal making it useless for its intended purpose, which is detection of the start bit of each incoming word. This can be fixed with a very simple hack inside the CoCo 3 (a single trace cut and a jumper to remove an unneeded inverter gate from the circuit). But since a hardware hack is required, few people have developed enthui-

siasm for writing driver software. It is also possible to make a special cable that shorts the bit-banger serial input to the bit-banger carrier detect. Then program the PIA chip that sees the carrier detect to generate an interrupt on each incoming start bit. This eliminates the internal hack, but requires a special cable. Long ago, one company produced an OS-9 terminal program that used such a trick for Level I OS-9 and the CoCo 1. (This matter was further discussed among OS-9 experts on the Delphi OS-9 SIG. Bruce Isted preformed some calculations and guesstimates from which he concluded that it should be possible to write a bi-directional bit-banger driver for OS-9 Level II that would work at 1200 baud provided not too many other tasks were being performed. His calculations indicated that at 2400 baud, this hypothetical driver would tie up more than half of the CoCo 3's time, even with use of the interrupt and timer, and would not be acceptable for OS-9 multi-tasking. I know of no attempts to actually write such a driver. Frankly, it would seem to be a worthwhile endeavor.)

Power from the Multi-Pak

Where do I find +5v, +12v, -12v and ground on the Multi-Pak Interface?

Steve Ricketts (STEVEPDX)
Portland, Oregon

Pin 1 of the Multi-Pak supplies -12 volts at 100 mA, Pin 2 supplies +12 volts at 300 mA and Pin 9 supplies +5 volts at up to about an amp. Pins 33 and 34, as well as the clips on each side of the 40-pin connectors, are ground. Note that these voltages are also available on the CoCo 1, but a +/-12-volt signal is not found on the CoCo 2 or 3.

No Semigraphics for CoCo 3

My Audio Spectrum Analyzer and Plug 'n Power ROM Paks work fine on my CoCo 1 and 2, but give unuseably distorted displays on my CoCo 3. What is the problem and can it be fixed?

Thomas E Lucas (TOMLUCAS)
La Grange, Illinois

Both of these ROM paks use the Semigraphics mode of the VDG chip in the CoCo 1 and 2 to achieve a combination of many colors and text on the screen at once with minimal memory for the program. This complex Block Graphics/Text mode is not supported by the GIME chip in the CoCo 3. Fixing the programs would involve considerable rewriting. No fixes are available at this time. Note that in the case of Spectrum Analyzer, Steve Bjork wrote a version that did not use the Semigraphics mode, but it

took more space than the 4K he had available for the ROM pak. Sadly, his non-Semigraphics version is legally tied up and won't be released.

Picturing the Sega

How do I connect my Magnavox 8CM515 monitor to a Sega Genesis video game machine? I tried to hook the 8-pin TTL video port on the Magnavox 8CM515 to the 8-pin port on the Sega using Sega pinout information you supplied, but cannot get an image. I am puzzled by the fact that my Sega puts out Hsync and Vsync on the same pin, whereas my Magnavox apparently requires separate lines. Also, what is the use of the +5-volt and composite-video lines on the Sega Genesis and of the Intensity line on the Magnavox video input?

Jody Ronning
Melrose, Wisconsin

First of all, you must not use the 8-pin TTL input port on the Magnavox. Instead, use the 6-pin analog-video input port since the Sega Genesis puts out analog video. The sync input circuitry on the Magnavox monitor is set up so it does not care what kind of sync you feed it; separate or combined, positive or negative. Just feed whatever sync you have into either (or both) the Hsync or Vsync inputs of the Magnavox. It will sort it all out and get the sync info it needs. Note this is not the case with the CM-8 monitor, which is less intelligent with respect to sync input. The CM-8 requires separate positive sync signals and will accept nothing else. For your reference, the 6-pin port on the Magnavox analog input has the following pinout:

1	green
2	Hsync
3	gnd
4	red
5	blue
6	Vsync

Pin 6 is the center pin, and pins 1 thru 5 are numbered sequentially clockwise as one looks at the socket on the Magnavox.

The +5-volt line on the Sega is present to allow powering some small circuit to facilitate sync conversion to produce different polarity or separate sync signals for monitors. The video output is present to feed into the composite-video input of monitors that have the same. This is the same type of one-line video signal used between present day VCR's and TV/monitors. This kind of video is also called NTSC composite video. Note that this sort of video will not give as nice a picture as RGB

video will. You do not need either the +5-volt line or the video line to connect your Magnavox 8CM515 monitor. You can run a cable that goes from the video line of the Sega to the video input on your Magnavox just to see how much poorer the video image is than the RGB image. The Intensity line is part of the IBM CGA digital video protocol and is of no use with the analog video output of the Sega or CoCo.

CM-8 for VGA?

Can I use my CM-8 monitor with an IBM VGA card?

Alan Parker
Grissom AFB, Indiana

No. The VGA card requires a monitor that can sync to a horizontal scan of 31.5 KHz. The CM-8 syncs to only 15.75 KHz. Note that even when emulating CGA video, VGA cards put out a video signal that syncs at 31.5 KHz. In that mode, the VGA card scans each line of the VGA monitor twice in order to achieve lower CGA-type resolution. This is of no help to someone trying to use a CM-8.

Avoid a CoCo 3 Funeral

My CoCo 3 recently died. When I turn it

on I get a blank screen. Is the GIME chip bad? The 68B09E? Radio Shack wanted \$50 just to diagnose the problem with no guarantee of fixing it for that price. I am not familiar with working on electronic equipment and cannot replace a soldered chip. Who can help me fix the computer?

Brad Renfro
Owensboro, Kentucky

If you do not have access to a friend who is skilled at desoldering and socketting 40-pin chips, your best alternative may be to just look for a good buy on a new CoCo 3. Note that they occasionally go on sale for \$129 at Radio Shack. CoCo Pro! (a RAINBOW advertiser) sometimes can sell used CoCo 3s for \$100 or less. What I would do is try the GIME chip from the bad computer in a known working computer. If that chip tests good, I'd swap out memory from the bad computer into a good computer to see if the memory was bad. If the memory tested good, we have exhausted the possibilities for socketed chips. The next thing I would do is desolder the 68B09E chip, solder in a socket and insert a new, good 68B09E. 68B09E chips are available from Jameco of Belmont, California, but a \$25

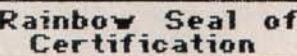
minimum order is required. They are also available through several RAINBOW advertisers, including Microcom and Disto.

[Editor's Note: We recently had a similar problem with one of our CoCo 3s. We removed the cover and pressed firmly on all four corners of the GIME chip. This took care of the problem immediately. Of course, we suggest reseating the GIME with "proper" tools.]

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P. O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services. Then at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form, which has complete instructions.



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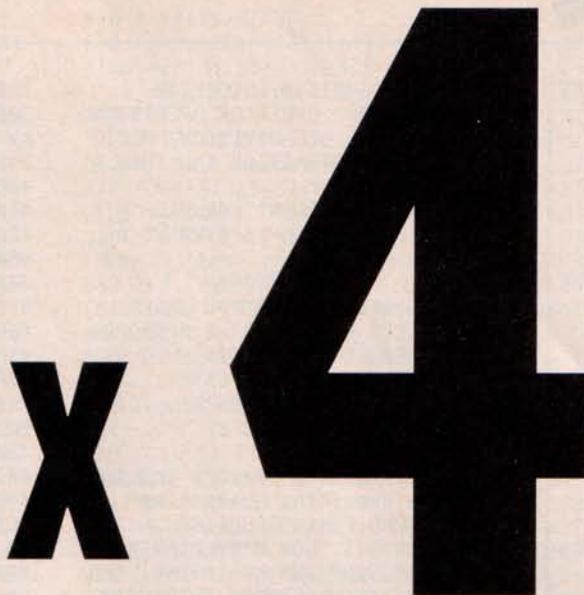
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*Making
numbers
as fun
as words*



In the Name of EQUALITY

by Bob Delbourgo

Scrabble is as popular today as the day it first came out on the market some three decades ago. By contrast, the game *Equable* (the numerical version of *Scrabble*) made a brief appearance about ten years ago but is now almost forgotten. This may be because people feel more comfortable with words than with numbers. Whatever the reason, I thought it would be a good time to resurrect the numerical version as a challenging and educational game. I have dubbed it *Equality*.

The instructions for *Equality* are included in the listing. I will not repeat them except to emphasize that you are dealing with integer arithmetic (whole numbers from 0 to 9). This means the strict order of operations is division followed by multiplication followed by subtraction and then addition — the way the CoCo handles sums.

Move the cursor with the arrow keys and type in the character (from the hand you

have been dealt) to make an insertion there. You begin with two “equals” (=) signs. As the game progresses you may run out of them, at which time you can change your hand by pressing C, thereby missing a turn. Please ensure that sums are properly separated and do not involve more than one equals sign. Otherwise CoCo will react. The computer also checks to see that your entries are along a line and that your sums along that line are numerically accurate. It does not check whether they fit in an orthogonal sense (although in principle it could have been programmed to do so — but that would take too long). Your score is based on the number and type of pieces you have placed, not on what has already been laid on the board in a previous round (for the precise values, read the directions in the listing).

The listing has been liberally commented, so I will not say much about it. The only noteworthy part is the subroutine in lines 950 through 1140, which calculates the sum when a string (A\$) is input. The game should appeal to math teachers at the primary level but can nevertheless be played seriously at higher levels. It can even be played solo, the aim being to maximize your score within 24 rounds.

Bob is a professor of physics, and he computes as a hobby. His interests lean toward scientific simulations and mathematical games. He may be contacted at 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, Australia 7005.

✓	
50	..... 76
110	..... 22
170	..... 247
230	..... 141
290	..... 153
330	..... 205
430	..... 98
520	..... 201
609	..... 204
650	..... 101
710	..... 119
760	..... 70
820	..... 185
880	..... 124
960	..... 91
1030	..... 217
1080	..... 39
END	..... 221

The Listing: EQUALITY

0 'COPYRIGHT 1990 FALSOFT, INC.
 9 'initialise variables and strings
 10 CLEAR500:GOTO1150
 20 DIMC(5),A(13),PT(15),PE(15):R=RND(-TIMER):C\$=CHR\$(8)+CHR\$(9)+CHR\$(10)+CHR\$(94)+"0123456789+-*/RCP"
 30 C(1)-61:C(2)-43:C(3)-45:C(4)-42:C(5)-47:T1\$="-L9T25V103C":T2\$="-L10T10V901G02G03G04G05G04G03G02GO1G"
 40 FORI=1TO7:N\$=-N\$+CHR\$(159)+CHR\$(239):NEXTI:N1\$=CHR\$(239)+N\$:N2\$=N\$+CHR\$(159)
 50 FORI=1TO4T01534STEP2:N=RND(5):R=RND(10):POKEI,47+R:POKEI+1,C(N):NEXTI
 60 PRINT@140,"EQUALITY":PRINT@236,"SCRABBLE":PRINT@110,"N":PRINT@174,"M":PRINT@206,"E":PRINT@270,"I":PRINT@302,"C":PRINT@334,"A":PRINT@272,"Y":PRINT@362,"R.DELBOURGO";
 70 PLAY"8CCCL4FFL8FL4AL12GP12FGP12AL4F"
 80 PRINT@481,STRING\$(5,"-")"INSTRUCTIONS <Y/N> ?"STRING\$(5,"-");
 90 I\$=INKEY\$:IFI\$="-N"THEN200ELSEIFI\$="-Y"THEN100ELSE90
 99 'instructions
 100 CLS:GOSUB1130:GOSUB1140
 110 PRINT"THIS BOARD GAME (FOR UP TO FOUR PLAYERS) IS A NUMERIC VERSION OF SCRABBLE. EVERY PLAYER IS DEALT 6 INTEGERS (0-9) AND 5 OPERATORS(+,-,*,/.) AT RANDOM WHICH ARE USED TO BUILD VALID SUMS ALONG A HORIZONTAL or VERTICAL LINE."
 120 GOSUB1140:PRINT"THE BOARD IS 15X15 AND INTEGERS MUST BE LAID ON "CHR\$(239)", OPERATORS ON "CHR\$(159);
 130 PRINT"ALL SUMS MUST BE SEPARATED BY "CHR\$(239)" AND/OR "CHR\$(159)". CAN ONLY CONTAIN one BUT ANY # OF INTEGERS/OPERATORS.":
 140 GOSUB1110

150 .CLS:GOSUB1130:GOSUB1140
 160 PRINT"THE ORDER OF OPERATION S IS FIXED TO BE: DIVISION, MULTIPLICATION, SUBTRACTION AND THEN ADDITION."
 170 GOSUB1140:PRINT"FOR EACH PIECE PLAYED SCORING IS #:VALUE OF DIGIT =:1 +:3 -:5 *:7 /:9":
 180 GOSUB1140:PRINT"YOU INSERT YOUR PIECES BY TYPING THE APPROPRIATE CHARACTER. WHEN FINISHED <P> PASSES PLAY TO NEXT PLAYER. <R> TO RETRACT INCORRECT ENTRY, <C> TO CHANGE all PIECES.":
 190 GOSUB1110
 199 'determine # players and initialise remaining quantities
 200 CLSRND(7)+1:GOSUB1130
 210 PRINT@64,"HOW MANY PLAYERS (4 MAX.)":INPUTNP:NP=INT(NP):IFN P<10RNP>1THENSOUND200,2:GOTO210
 220 DIMP\$(NP),SC(NP),NN\$(NP),00\$(NP):RM=24/NP
 230 FORI=1TONP:PRINT@64*(I+1),"PLAYER #":I"YOUR NAME":INPUTP\$(I):IFLEN(P\$(I))>8THENP\$(I)=LEFT\$(P\$(I),8)
 240 NEXTI
 250 CLS:FORI=0TO15:POKE1504+I,175:POKE1039+32*I,175:POKE1072+I,175:POKE1232+I,175:POKE1296+I,175:NEXTI:POKE1048,175
 260 FORI=0TO96STEP32:POKE1112+I,175:NEXTI:FORI=1TONP:SC(I)=0:NN\$(I)=""":00\$(I)=""":NEXTI:RD=0:X=7:Y=7
 270 FORI=0TO448STEP64:PRINT@I,N1\$::NEXTI:FORI=32TO416STEP64:PRINT@I,N2\$::NEXTI
 280 PRINT@17,"PLAYER":PRINT@26,"SCORE":FORI=1TONP:PRINT@48+32*I,P\$(I):NEXTI
 290 PRINT@304,"move cursor with":PRINT@336,"the arrow keys":PINT@368,"type character":PRINT@400,"to insert piece":PRINT@432,"<R> to retract":PRINT@464,"<C> to change":PRINT@496,"<P> to pass":
 299 'deal pieces to each player, 6 numbers, 3 operators and 2 =
 300 FORI=1TONP:FORJ=1TO6:NN\$(I)=NN\$(I)+CHR\$(47+RND(10)):NEXTJ:FORJ=1TO3:00\$(I)=00\$(I)+CHR\$(C(RND(4)+1)):NEXTJ:00\$(I)=00\$(I)=""":NEXTI
 309 'start game
 310 P=0:RD=RD+1:IFRD=RM THEN370
 319 'show hand and wait for keypress
 320 Q=1:T\$=""":S\$=""":P=P+1:IFP=NP+1THEN310
 330 PRINT@240,CHR\$(229)+NN\$(P)+CHR\$(234)+CHR\$(149)+00\$(P)+CHR\$(154)+CHR\$(175):
 340 I\$=INKEY\$:GOSUB780:IFI\$=""":THEN340
 350 ONINSTR(1,C\$,I\$) GOTO390,410,.430,.450,.470,.470,.470,.470,.470,.470,.470,.470,.470,.490,.490,.490,.490,.490,.510,.560,.600
 360 GOSUB780:GOTO340
 370 PRINT@483,"GAME OVER!":PLAY
 T2\$":PRINT@17,"<S> TO RESTART"
 380 IFINKEY\$<>"S"THENPRINT@17,"<s> to restart":GOTO370ELSE250
 390 X=X-1:IFX<0THENX=0 'left
 400 GOTO340
 410 X=X+1:IFX>14THENX=14 'right
 420 GOTO340
 430 Y=Y+1:IFY>14THENY=14 'down
 440 GOTO340
 450 Y=Y-1:IFY<0THENY=0 'up
 460 GOTO340
 469 'number insertion
 470 I=INSTR(1,NN\$(P),I\$):IFI=0OR PEEK(1024+X+32*Y)<>239THEN SOUND100,1:GOTO340
 480 GOSUB790:GOTO330
 489 'operator insertion
 490 I=INSTR(1,00\$(P),I\$):IFI=0OR PEEK(1024+X+32*Y)<>159THEN SOUND100,1:GOTO340
 500 GOSUB820:GOTO330
 509 'retraction routine
 510 IFQ=1THENSOUND100,1:GOTO340
 520 FORI=1TOQ-1:POKEPT(I),PE(I):NEXTI 'restore board
 530 NN\$(P)=NN\$(P)+\$S:\$S="" 'read just strings
 540 00\$(P)=00\$(P)+T\$:\$T=""
 550 Q=1:GOTO330
 559 'change routine
 560 IFQ>1THENSOUND100,1:GOTO330 ELSE>NN\$(P)=""":00\$(P)=""":
 570 FORJ=1TO6:NN\$(P)=NN\$(P)+CHR\$(47+RND(10)):NEXTJ
 580 FORJ=1TO4:00\$(P)=00\$(P)+CHR\$(C(RND(4)+1)):NEXTJ:00\$(P)=00\$(P)=""":
 590 PRINT@58+32*P,USING"####":SC(P):PLAYT2\$+T2\$+T2\$+T2\$:GOTO320
 600 SC=0:IFQ=2THEN770
 609 'pass routine
 610 PRINT@484,"CHECKING":D=PT(2)-PT(1):IFABS(D)>15THEND=32ELSE D=1
 620 FORII=2TOQ-1:IFD=1ANDABS(PT(II)-PT(1))>15THEN770 'check if horizontal
 630 IFD=32ANDPT(II)-PT(1)<>32*INT((PT(II)-PT(1))/32)THEN770 'check if vertical
 640 NEXTII
 649 'determine string along line of play
 650 L\$=""":IFD=1THENP1=32*INT(PT(1)/32):FORI=P1 TOP1+14:L\$=L\$+CHR\$(PEEK(I)-64):NEXTI 'along horizontal
 660 IFD=32THENP1=1024+PT(1)-32*INT(PT(1)/32):FORI=P1 TOP1+448STEP32:L\$=L\$+CHR\$(PEEK(I)-64):NEXTI 'along vertical
 670 L=LEN(L\$)
 679 'break up into substrings for analysis
 680 FORKJ=1TO1:IFMID\$(L\$,K,1)=CHR\$(95)ORMID\$(L\$,K,1)=CHR\$(175)THEN710ELSENEXTJ
 690 L\$=RIGHT\$(L\$,L-K+1):L=L-K+1
 700 FORJJ=1TO1:IFMID\$(L\$,JJ,1)=CHR\$(95)ORMID\$(L\$,JJ,1)=CHR\$(175)THEN710ELSENEXTJJ
 709 'get substring
 710 SS\$=LEFT\$(L\$,JJ-1):SS=LEN(SS\$):IFSS\$>1THEN GOSUB850:IFKK=1THEN

```

770
720 IFL<JJ THEN730ELSEL$=RIGHT$(L$,L-JJ+1):L=L-JJ+1:GOT0680
730 FORTT=1TOLEN($$+T$):TT$=MID$( $$+T$,TT,1):SC=SC+INSTR(1,"1234
56789",TT$)+INSTR(1,"- + - * /",
TT$):NEXTTT
740 SC(P)=SC(P)+SC:PRINT@58+32*P
,USING"###";SC(P):PRINT@484,STR
ING$(8,175);
750 PLAYT2$+T2$+T2$:IFLEN($$ )>0THENFORJ=1TOLEN($$ ):NN$(P)=NN
$(P)+CHR$(47+RND(10)):NEXTJ
755 IFLEN(T$)>0THENFORJ=1TOLEN(T
$):OO$(P)=OO$(P)+CHR$(C(RND(4)+1
)):NEXTJ
760 GOT0320
770 PRINT@484,"INVALID!":;:SOUND1
0,20:PRINT@484,STRING$(8,175):;:G
OT0520
780 PT=1024+X+32*Y:PP=1080+32*P:
PE=PEEK(PT):POKEPT,PE:POKEPT,191
:POKEPP,175:POKEPP,207:PLAYT1$:P
OKEPP,175:PT(Q)=PT:PE(Q)=PE:POKE
PT,PE:RETURN
789 'readjust number string
790 NN=LEN(NN$(P)):NN$(P)=LEFT$(NN$(P),I-1)+RIGHT$(NN$(P),NN-I)
800 S$=S$+I$:PRINT@X+32*Y,I$:Q=Q+1
810 PLAYT2$:RETURN
819 'readjust operator string
820 OO=LEN(OO$(P)):OO$(P)=LEFT$(OO$(P),I-1)+RIGHT$(OO$(P),OO-I)
830 T$=T$+I$:PRINT@X+32*Y,I$:Q=Q+1
840 PLAYT2$:RETURN
850 KK=0:FORI=1TO13:A(I)=0:NEXTI
:IFSS=2*INT(SS/2)THENKK=1:RETURN
'valid string must be odd
860 FORI=1TOSS STEP2:N$=MID$(SS
,I,1):IFN$<"0"ORN$>"9"THENKK=1:R
ETURN 'test number sequence
870 FORI=2TOSS STEP2:O$=MID$(SS
,I,1):IFO$="-"/"ORO$="-"OR
O$="-"ORO$="-"THENNEXTI ELSEKK=1
:RETURN 'test operator sequence
880 E=0:FORI=2TOSS STEP2:IFMID$(SS
,I,1)="="THENE=E+1 'test # eq
ual signs in substring
890 NEXTI:IFE=0ORE>1THENKK=1:RET
URN
900 FORI=2TOSS STEP2:IFMID$(SS
,I,1)<> "="THENNEXTI ELSEE=I
910 LL$=LEFT$(SS,E-1):RR$=RIGHT
$(SS,SS-E) 'split substrings on
either side of = sign
920 A$=LL$:GOSUB950:LL=A:A$=RR$:
GOSUB950:RR=A
930 IFAPES(LL-RR)>,000001THENKK=1
940 RETURN
949 'carry out the sums on the s
trings
950 N=(LEN(A$)+1)/2:O=N-1
960 FORI=1TON:A(I)=VAL(MID$(A$,2
*I-1,1)):NEXTI
970 O$="" :FORI=1TOO:O$=O$+MID$(A
$,2*I,1):NEXTI
979 'division first
980 DI=INSTR(1,O$,"/"):IFDI=0THE
N1010
990 A(DI)=A(DI)/A(DI+1):FORI=DI+

```

```

1TON:A(I)=A(I+1):NEXTI
1000 O$=LEFT$(O$,DI-1)+RIGHT$(O$
,0-DI):N=N-1:O=0-1:GOT0980
1009 'then multiplication
1010 MU=INSTR(1,O$,"*"):IFMU=0TH
EN1040
1020 A(MU)=A(MU)*A(MU+1):FORI=MU
+1TON:A(I)=A(I+1):NEXTI
1030 O$=LEFT$(O$,MU-1)+RIGHT$(O$
,0-MU):N=N-1:O=0-1:GOT0980
1039 'then subtraction
1040 SU=INSTR(1,O$,"-"):IFSU=0TH
EN1070
1050 A(SU)=A(SU)-A(SU+1):FORI=SU
+1TON:A(I)=A(I+1):NEXTI
1060 O$=LEFT$(O$,SU-1)+RIGHT$(O$
,0-SU):N=N-1:O=0-1:GOT01040
1069 'then addition
1070 AD=INSTR(1,O$,"+"):IFAD=0TH
EN1100
1080 A(AD)=A(AD)+A(AD+1):FORI=AD
+1TON:A(I)=A(I+1):NEXTI
1090 O$=LEFT$(O$,AD-1)+RIGHT$(O$
,0-AD):N=N-1:O=0-1:GOT01070
1099 'the final result of the su
m
1100 A=A(1):RETURN
1110 PRINT@481,STRING$(9,"-");t
ype any key"STRING$(9,"-");
1120 IFINKEY$=""THEN1120ELSERETU
RN
1130 PRINTSTRING$(12,"-")"equali
ty"STRING$(12,"-");:RETURN
1140 PRINTSTRING$(32,"-");:RETUR
N
1150 PCLEAR2:GOT020

```

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*Try your creative
hand at
writing poetry*

Fishing for the Right Words

by Solla Carrock



omputer poetry
— a new genre.
Fishbowl en-
courages you to
let your creative
juices flow. The
program ran-
domly chooses
words or phrases

in the data lines and displays 12 of them. You then use the 12 words to compose a poem. The words I've put in the data lines are geared for a child, but an adult could also use them or modify the selection of words and phrases.

The 12 words act as a stimulus for writing a poem by requiring you to make unusual combinations of ideas and imagery. You can edit your work by replacing old lines with new ones. You can also print the poem at any time.

After the 12 words are shown on the screen, type in lines of the poem based on the words given. Up to 100 lines may be typed in (with an average of 90 characters or less per line). You must press ENTER to indicate the end of a line. To see the 12 words again, enter an asterisk (*), then continue to add to the lines of the poem. To make a new choice, type a slash (/) and press ENTER.

Solla Carrock is a writer and artist, with a master's degree in psychology. She has worked with children and has taught and counseled adults as well. She purchased a Color Computer about a year ago — for her daughter — and has been writing programs ever since.

The program gives you a list of choices:
View the poem, Print the poem, Change a
line, Add new lines, or Write a new poem.

If you choose Option 1, press the @ key to print the first line of the poem on the screen. Press it repeatedly to print succeeding lines. Press R for a list of choices.

If you choose Option 2, you can print the poem by entering the letter P. If you do not type P, you are returned to the menu.

Option 3 lets you replace an old line with a new one. Type the line number and press ENTER. The old line is displayed, and you are asked to type a new line to replace

32K Extended

43	126	505	32	640	34
62	38	520	61	660	214
85	250	535	106	680	107
215	34	550	202	700	43
240	5	565	12	720	138
269	241	580	189	740	154
290	131	595	162	760	203
325	141	610	92		
420	150	625	86		

The Listing: FISHBOWL

```

0 *COPYRIGHT 1990 FALSOFT, INC.
1 PCLEAR 1:REM FISHBOWL
10 CLEAR 9000
15 DIM P$(100)
20 DIM A$(1000)
25 DIM WO$(15)
30 REM OPENING DISPLAY AND SONG
35 CLS 0:FOR X=23 TO 32
36 SET(X,11,4)
37 NEXT X
38 FOR X=21 TO 32
39 SET (X,19,4):NEXT X
40 FOR Y=11 TO 19
41 SET(41,Y,4)
42 NEXT Y
43 SET(22,12,4):SET(19,15,4):SET
44 (25,13,4)
45 SET(21,13,4):SET(19,17,4)
46 SET(20,14,4):SET (20,18,4)
47 X=33:Y=11
48 FOR T=1 TO 8
49 SET(X,Y,4)
50 X=X+1:Y=Y+1
51 NEXT T
52 X=33:Y=18
53 FOR T=1 TO 8
54 SET(X,Y,4)
55 X=X+1:Y=Y-1
56 NEXT T
57 SET(20,15,4):SET (21,15,4)

```

it. Then you are returned to make a new choice.

If you choose Option 4, you can again add lines to the end of the poem.

Option 5 asks you to type P and press ENTER to start a new poem with a new list of words. The program reminds you that this means the old poem will be lost, so if you fail to enter P, you are returned to the

choices and given a chance to print or copy the poem before going on.

While entering *Fishbowl*, you may change or add to the data lines, as long as you don't exceed 1000 pieces of data. Remember to put a @ character as the last piece of data (not anywhere else) in the data lines. Type RUN and press ENTER. If the program is typed in correctly, you should

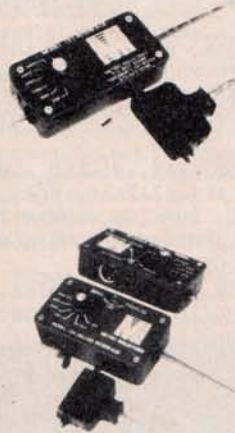
see a fish in a fishbowl and hear music then, after a pause, a word list and instructions.

Make sure the program works correctly by using it — try all the options. Correct any errors by checking your program lines against the program listing. When you are sure the program works correctly, save the program on disk or tape. Enjoy. □

```
57 SET(20,17.4):SET(21,17.4)
60 FOR X=9 TO 59
62 SET(X,7.5)
64 NEXT X
66 FOR X=13TO55
68 SET(X,29.5)
70 NEXT X
72 FOR Y=12 TO 26
74 SET(10,Y.5):SET(58,Y.5)
76 NEXT Y
78 SET(10,8.5):SET(11,9.5):SET(1
2,10.5)
80 SET(11,11.5):SET(11,27.5):SET
(12,28.5)
82 SET(58,8.5):SET(57,9.5):SET(5
6,10.5)
84 SET(57,11.5):SET(57,27.5):SET
(56,28.5)
85 PLAY "03L4DDEGF+EDDEGF+EDGF+G
AGEL3DL2DL4DEFEC02BA03DED02BAGB0
3DGFEFL3GL2G"
155 PRINT@11,"FISHBOWL"
160 REM READ IN WORDS, RANDOMLY C
HOOSE 12 AND PRINT WITH INSTRUCT
IONS
165 N=1
170 READ A$(N)
175 IF A$(N)="-" THEN 190
180 N=N+1
185 GOTO 170
190 FOR T=1 TO 12
195 R=RND(N-1)
200 WO$(T)=A$(R)
205 NEXT T
210 CLS 0:L=1
215 PRINT"THESE ARE THE WORDS YO
U'VE CAUGHT FROM THE FISHBOWL:";
220 GOSUB 252
225 PRINT "USE THESE WORDS TO WR
```

```
ITE A POEM. IF YOU NEED OTHER WO
RDS YOU MAY USE THEM TOO, BUT LE
T THESE BE THE MAIN WORDS."
230 LINE INPUT"PRESS ENTER TO CO
NTINUE.":AN$:CLS 0
235 PRINT"GO AHEAD AND TYPE WHAT
EVER YOU THINK OF. IT IS EASY TO
CHANGE THINGS LATER. YOU MAY TYP
E UP TO 100 LINES(BUT LESS IF YO
UR LINES ARE VERY LONG). AFTER E
ACH LINE PRESS THE ENTER KEY.":T
240 PRINT"TYPE AN ASTERICK <> T
HEN <ENTER> WHENEVER YOU WANT TO
SEE THE WORDS YOU CAUGHT. TYPE SL
ASH</> THEN <ENTER> TO CHANGE LI
NES. LOOK AT WHAT YOU'VE WRITTEN
, OR PRINT THE POEM."
242 LINE INPUT"PRESS ENTER TO CO
NTINUE.":AN$
247 CLS 0:GOSUB 252:GOSUB 267:GO
TO 270
252 FOR T1=1 TO 12
257 PRINT WO$(T1) ":":
262 NEXT T1:RETURN
266 REM PRINT WORDS ON PRINTER
267 LINE INPUT"IF YOU HAVE A PRI
INTER, AND IT IS ON, TYPE -P- AND
ENTER TO PRINT WORDS, OTHERWISE
JUST PRESS ENTER":PN$"
268 IF PN$="-P" THEN FOR T1=1 TO
12: PRINT#-2,TAB(10)WO$(T1):NEXT
T1
269 RETURN
270 PRINT L":":LINE INPUT P$(L)
:REM INPUT LINES OF POEM
275 IF LEFT$(P$(L),1)="/" THEN G
OTO 290
280 IF LEFT$(P$(L),1)="*" THEN G
OSUB 252:GOTO 270
```

```
285 L=L+1:IF L>100 THEN PRINT"LI
MIT OF 100 LINES IN POEM":GOTO 2
90 ELSE GOTO 270
289 REM MAKE NEW CHOICES
290 CLS0:PRINT"DO YOU WISH TO 1>
VIEW POEM:2)PRINT POEM ON PRINTE
R:3)CHANGE A LINE: 4)ADD NEW LIN
ES:5)WRITE ANOTHER POEM?":INPUT"
TYPE NUMBER AND ENTER":AN:IF AN<
1 OR AN>5 THEN 290
295 ON AN GOTO 300,350,400,460,4
50
299 REM PRINT LINES OF POEM ONE
LINE AT A TIME
300 F=1:CLS:PRINT"PRESS <@> TO V
IEW FIRST LINE AND EACH ADDITION
AL LINE. PRESS <R> TO RETURN FOR
NEW CHOICE"
305 AN$=INKEY$:IF AN$="" THEN 30
5
310 IF AN$="R" THEN 290
315 IF AN$="@" THEN PRINT F;"":P$(F)
320 F=F+1:IF F=L OR F>100 THEN P
RINT"NO MORE LINES"
325 GOTO 305
349 REM PRINT POEM ON PRINTER
350 LINE INPUT"TURN ON PRINTER.
PRESS <P> THEN ENTER TO PRINT.":;
AN$
355 IF AN$<>"P" THEN 290
360 FOR LI=1 TO L
365 PRINT#-2,TAB(5)P$(LI)
370 NEXT LI
375 GOTO 290
399 REM CHANGE LINE OF POEM
400 INPUT "WHICH LINE DO YOU WAN
T TO CHANGE":LN
410 PRINT LN":":P$(LN)
```



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415 LINE INPUT"TYPE THE NEW LINE
 .";P\$(LN)
 420 GOTO 290
 449 REM WRITE NEW POEM
 450 LINE INPUT"PRESS<P> AND ENTER TO START A NEW POEM, OR JUST ENTER TO MAKE A DIFFERENT CHOICE.
 REMEMBER YOU WILL LOSE YOUR OLD POEM IF YOU WRITE A NEW ONE, SO COPY OR PRINT IT IF YOU WANT TO KEEP IT.";AN\$
 455 IF AN\$<>"P" THEN 290 ELSE 190
 460 L-L-1:GOTO 285
 500 DATA MAMA,SEND CHAIN,LONG AGO,BABOON,HANDSOME,ONCE UPON A TIME,A VERY LOUD VOICE,BIG FEAST,SECRET
 505 DATA IN THAT VILLAGE,SO GREEZY, WE HAVE NONE,CHASE,FOUND HER VOICE,SO SAD,NOWHERE TO GO,OUR PEOPLE,CUNNING AND BOLD,MOTHER RABBIT,A GOOD CLIMBER
 510 DATA FLAT ROCK,CUT THE CHAIN,OLD MOTHER, WITH A THUMP, FELL IN A HEAP, NEARLY SQUASHED,HOLDING,SHINING SEAT
 515 DATA JUICE,TRIED TO KILL, BEAUTIFUL LONG HAIR, STAND, AT LAST, OWN FOUR FEET, A DIFFERENT ANIMAL,SICKNESS,DEATHJUICE, DEAR ONES, TWO-TIMER, SORE, THE BLOW COMES, EMPTY ROOM, KITCHEN TABLE CLOTHES PINS, INVENTED, LILACS, HEAT, LEAVE, HOUSE
 520 DATA SEND THIS MESSAGE, MADE THE WORLD, PROMISED,PRIMROSES, WAGGED HIS TALE, VERY SLOW, WALKING TO EARTH,VERY WISE, WISHES, FISHES, RAISED HIS LEFT FOOT,DRAINED HIS BODY, THROUGH THE WIND, CRUNCHING HIS BONE
 525 DATA HEARD HER,PLODDING ON, TORTOISE, HEAP OF RUBBISH, FOR A BONE,BESIDE THE PATH, CUTTING, SLOWED DOWN, FOUND, SAT DOWN, STILL EATING,WINK YOUR EYE, DROPPED, GRAB, FROM THE GROUND,MUNCHING, LOUDLY, OUT OF THE BUSH, SATISFIED,SO THIRSTY, VERY HOT
 530 DATA WEAKER AND WEAKER, AT EVERY BREATH, SCORNFUL LAUGH, RUN PAST, AN OVEN, IN HER THROAT, BIRDS, DRINK, STREAM,CRYING, NOSING ALONG, LOOKING FOR FOOD,FAINT , PANT, REFRESHED AND STRONG
 535 DATA NAKED,TOUCH,WHISTLE, PLEASE,MY FAMILY,FRUIT,ALL OF THEM GIRLS, FOUR CHILDREN, WORSE THAN THAT, HARD WORK, IGNORED,MARRIED AGAIN, SPLIT APART, RANY OR DRY, TO SELL,GROW, THE BRIGHTEST AND MOST BEAUTIFUL
 540 DATA COMPLAINED, MONEY TO BUY FOOD, IN SECRET, TEND THE GARDEN,LOVED TO PLANT FLOWERS,NEVER GAVE HER THE CHANCE,LOSS, NEVER CHANGED,RED JUICY FRUIT,SEEDS
 545 DATA WOKE UP, WATER THE PLANTS, ATE ATE ATE,SHE LOVED,SO MUCH,BELONGED,HER CHILDREN,WANTED TO DANCE,FULLY RIPE,SO BIG AND SWEET,NEVER ALLOW HER,TO HAVE,SELL RAGED, COULD NOT SLEEP, THAT NIGHT
 550 DATA WIND,SILENCE,DAYLIGHT CAME,CREPT,STARTED SINGING,TO LIFE AGAIN,BRING ME,OBEY ME,POUNCE, SHRIVELED,ASHAMED GROUND WOULD OPEN, SWALLOW UP,KNEW VERY WELL,BEGAN TO GROW, THEY ASKED HER 555 DATA MY BODY, FLAMES, BASKET LOADS OF APPLES, TASTED, SMELLED , TOUCHED, HEARD,SEE,RICHEST,GRABBED HER AND PULLED,SPoke SOFTLY , SWEET, DRY BONE,LARGE CAN, WATER,CANDY, MELON, PEACH,MONKEYS,LITTLE MONEY, EARN A LIVING
 560 DATA STRONG ENOUGH, ACROSS THE WATER, I LOVED, STOP, WENT TO THE WOODS, LISTEN, TO THE BIRDS . ON THE ISLANDS, RIVER WAS LOW, CROSS SAFELY, THE BEST, EARLY MORNING, CUT WOOD, BABY, FISHERMAN, FISHERWOMAN, BUSH,CRICKETS, A LITTLE SNAKE
 565 DATA BACK YARD, JUNK YARD, PALM WINE, TRAP,MOONLIT,RED OIL,DRY SEASON, RAINY, SNAPPED, TO THE SHORE,POUNDED,STARTED BIRD, DASHED,MELTING, FEARS, CANNOT FIND , DOTTED,FARAWAY PLACE
 570 DATA WOMEN SMILED, DANGER, SUCK OUT OF HIS HEAD, UTTER, BELIEVE ME, MIGHTY FIGURE, GIANT, SOUND, WIDE OPEN, THE DOOR, A HUT , SMILED DOWN, ASKED, WHAT HE WANTED, GIVE ME,EYEBALLS, LISTEN TO ME, EXPECTING
 575 DATA COULD NOT MOVE, FLEW AWAY, RAN AWAY, CAME TO A HUT, THUMP, SO FAR AWAY, STUMPS OF TREES , LONG WAY TO GO, GIRAFFE, SPOTS , STRIPES, FANCY CLOTHES, A GOOD GIRL,BANJO,SPRING LIKE A LEAPARD,WARNING, ATTIC,SHOOK THE GROUND
 580 DATA IN THE DARK, BLOOD, MOTHER GONE,YELLOW HOUSE, GREEN, RED, YELLOW, PINK, BLUE, PEARS, CORN, VEGETABLES, ORANGE, ORANGES, WATERMELON, RAISINS,PEANUTS, POTATOES, RICE AND BEANS, SPAGHETTI
 585 DATA LEFT, HUSH, LITTLE BABY , BUILD A HOUSE, GUITAR, PIANO, GO SEE, HEARTS, PLAY CARDS, PLAY GAMES, HOPSKOTCH, GO TO BED, DRINK WATER, DRINK BEER, SO SWEET, EVIL LAUGH,NEARER, BOILED, LARGE CAN, COFFEE, MILK, TEA, CHOCOLATE,JELLY BEANS
 590 DATA BLINDED, LEAVES, CHATTER OF CHILDREN, CHATTER OF MONEY, GROWN UPS, GROWN UP TALK, MONEY BAGS, RUSHED AWAY, CLAPPED HIS HANDS, EARS, FEET, STOMACH, BUTTERFLIES
 595 DATA OCEAN, SAND, FEAR, DANCER, LEGS, ARMS, HANDS, FEET, TOES, 6 TOES, SWEET BEEF, STEW, CORN MEAL, BREAD, KNIFE, FOOL, BAG OF MONEY, COOKING FIRE, SMOKE, PAPER OF RAIN, BROKEN POTS
 600 DATA SCREAMED, MOTHS, MOTHERS WHO YELLED, FROM THAT TIME ON, NOTHING, WARNING, SEIZED BY A LEG, TOSSED, NEVER AGAIN, RACED A WAY, PICKED UP,WORK HARD,PLENTY
 605 DATA STUMBLED INTO, MISFORTUNE, TOO STUPID, LOST HER MOTHER, LITTLE,FLOWERS, PLAY, WATCH, THE HILLS, RIVER BANK, JUST OUTSIDE, SWIM, MIMIC, PRETEND, FROGS, THAT HID, TINY SILVER FISH
 610 DATA BELIEVES IN, CROAKING, MANY, LIKED TO CATCH, OTHER GIRLS, COLORED PETALS,TELL ME, KNEW MANY, ASKING, HEARTS HEAVY, SLIGHTEST TRACES, BUNCHES OF FLOWERS , TINY INSECT, SKIPPING, JUMPING , FORGOT, TOO LATE
 615 DATA NEVER UNDERSTOOD, WANTED TO KILL, TUCKED, IN A POCKET, WANDERED, AFRAID, TINY INSECTS, LOSE THEIR WINGS, WING, OUTSIDE, HUNDREDS, NEARLY DONE, HUNTING, THE PATH, HOW TO GET BACK, SOON IT WOULD BE DARK
 620 DATA START SINGING, LIGHTER, IMAGINE, DARK, GATHERED, CRYING , HEARD THE SINGING, HURRYING, THE SAME WAY, GROWING LOUDER, HILARIOUS, BREATHLESS, ANGRY SCOLDING , SUN SETTING, EMBRACED, WALKED, SAVED
 625 DATA SHINING, LEAVE IT THERE , IN TROUBLE, TERRIBLE THINGS, WONDERFUL THINGS, HELP ME, FATHER , PAPA, BROTHER, DADDY, SISTER, MET IN SECRED, WORKED, SACKS OF CHARCOAL, PILES, BUSH, ANIMALS, TRICKS, TEASING, LOVED, I LOVED
 630 DATA PETRIFIED FOREST,SWIM LIKE A FISH, GLANCED, FURNACE, EAETH, HEAVEN, SEA, SEE ME, CELEBRATE, BORN, INSTEAD, STAYING A HOME, WENT FISHING, TALES OF SEAMEN, FRIEND
 635 DATA ACRES OF GRAY, FARMING, COULD NOT SEE, BASHFUL, SHY, READ FRIEND, FORGIVE, LISTENED, RESTLING, HARDLY DARE, GAZING, COOKING, CANDY, RICHLY DRESSED, NAME, INSISTED, ENVY, MARRY, CAME OPENLY, DID NOT WORRY, SILENT, HOW COULD SHE CHOOSE
 640 DATA THAWING RIVER, LONGED TO DISAPPEAR, HARDWORKING, OPEN-HEARTED, BEST, HARVEST, KIND, HOME TIRED, COLORED HER LIPS, OUR MOTHERS, OUR FATHER, BODY, SLEEP WELL, GOOD THING, BAD THING
 645 DATA COLD BED, DREAMS, STOP COMING,NO PLACE TO TALK, DUST, REST, WANT, BITTERLY DISAPPOINTED , KEEP OUT, SAD, TRIUMPH, KING, QUEEN, QUICK, GUESTS, BEER
 650 DATA A USUAL MISTAKE, SINGER S, DANCERS, PIANO PLAYER, PIZZA, POTATO CHIPS, ICE CREAM, LIKED BY, LICKED BY, LOOK AT ME, WHIRLS
 655 DATA PUZZLE, HAT, COAT, THREE DWARVES, NEW MOON, IF I COULD, HIDE NOTHING, LITTLE ONE, LOOK A LONG TIME, FELL OFF, TREE, STRONG BRANCHES, SWING
 660 DATA BRUSH AWAY, WICKED, SWEET, HONEYED, LET IT FALL, BOAT, SHIP, SAILING, SURFING, HUMAN BONES, A COW, LIONS, EARLY MORNING , THE MIDDLE OF THE NIGHT
 665 DATA UNDER THE CHIN, BATHE, BY THE SNOW, RISE, HANDSOME, WINDOW, LADY, TUMBLE-DOWN, ONLY AHEAD, LONG JOURNEY, HORROR, EVERYTHING SEEMED TO BE FALLING OFF,

THAT OLD HOUSE
 670 DATA BEARDS, GLISHTENED, FULL, HALF-DEAD, RIGHT HAND, LEFT THEM LYING, IN THE ROAD, FIND MY WAY, SO YOU SAY, WRONG, SHAKING, GREAT FIRE, IRON ROD, HEAD
 675 DATA STRETCHED, CONQUERED, CHILD, ROAST, UP, COME TO SEE, YOUR BONES, REMEMBERED, HUNTING AT NIGHT, TRY TO SING, EMPTY, TREMBLE, BLACK
 680 DATA SURELY WAKE, WHITE, SUSPICIOUS, KNITTED, ROPE, IN TROUBLE, THROAT, EAT YOU, BOUND, LIGHT OF THE FIRE, WAILING, STOPPED TO LISTEN, MOVED TOGETHER, DREW NEARER
 685 DATA DESERT YOU, FOLLOW, DIFTING, HAUNTED, SAVE, FOREST, AS FAST AS THEY COULD, GOING, TIED UP, ALONE, SHOT AT HIM, A TIGER, THREE BULLETS, BOUNCED OFF
 690 DATA PLAYED, NIGHTGOWNS, LONG AND WHITE, FLOATED, STRANGE, LACE, SNEAKERS, WALKED SOFTLY, BU STLED NOISILY, PIERCING SHRIEK, A GUN, SHAKE HEAD
 695 DATA CATCHES TIGERS, DEER, SHAKE AND SHAKE, SPIDER, FLIE, BAT, WITCHES, VERY FAT, TOP HAT, SLIPPED DOWN, ENOUGH TO EAT, ACC USE, MOTHER YELLED, SO LOUD
 700 DATA THE STREET, THIS PLACE, THIS TIME, WHERE I WAS, I DID NOT DO IT, WILD WEATHER, MAGIC, OUR, NORTH POLE, STAR, NORTH STA

R, WHERE I FOUND IT, MARRIAGE, FA MOUS
 705 DATA MOUSE-TRAP, DUST, PERFUME, STAND OUTSIDE, LOST, HEAVY, LIGHT, WHITE, PRINCESS, WISE, PRISONER, FISH, OWL
 710 DATA LOOK TWICE, MORE AND MORE CHILDREN, WILD DEER, WANDERERS, SO THIN, SUGAR CANE, AWKWARD, SILLY WOMAN, SILLY MAN, WISE WOMAN, DARK, HE HAD TEN CHILDREN
 715 DATA PRIZE, SOFTER, WILD, HOMELESS, FED, PARENTS, MY DAUGHTER, MY SON, GONE FOR YEARS, WELCOMES, ONLY CHILD, HOUSE, WINDBLOWN, LAST ONE, COOKIES
 720 DATA LIKE AN OAK, SHE STOOD, BENEATH THE MOUNTAIN, THICK BRANCHES, STARS IN MILLIONS, WARM EMOTION, SPREADS HER RAYS, TIS NOT FOR HER
 725 DATA TIS NOT FOR HIM, MOONRISE, WHEN THE BIRDS GO, SWEETEST THING, ACORN, FRAGRANCE, POOREST LEAF, SLENDER LACE-LEAFED BRANCHES
 730 DATA WHIRLWINDS, HIDDEN NEST, HONEY-SWEET, HAIR DOWN-STREAMING, LIGHTS PAINTING, SUN DRIED, BLEACHING, SOFTLY ROUNDED, PEACH, PEAR, PLUM
 735 DATA HIGH WHEELED WAGONS, LIGHT, RICH VINE, CHICKENS, RANCH FOLK, CAMP, BIRDS, BEES, COTTON WOOD TREE, SHALLOW WELL, SHEPARD
 740 DATA SNATCHED A LITTLE FOOD.

SMALL CIRCLE, SLOW MOVING, GUARDIAN, NIGHT HAWK, VALLEY, FROM THE WORLD, SHUT IN, GOLDEN
 745 DATA FAIRY FLUTES, DRAGONFLY, PEACH LEAF BOAT, WHERE THE WIND, TALL-LEAVED STALK, BLOOMS TWICE, HONEY THROATED CALL
 750 DATA HUMAN LONGING, TENDERNESS, SUCKLING CHILD, BREASTFULLS OF MILK, SLOWLY BURNS, GARDEN DIRT, COWMEN, MILKING, BUTTER
 755 DATA A SMALL PUMPKIN, CATCH IT, SMOOTH AND FINE, NUTMEG AND GINGER, PLEAD, TO ANTELOPE, CRUMBING ROCK, VERY BLUE, BLUE CORN
 760 DATA FROM THE NORTH, THIS WAY, INSIDE THE CLOUD, VERY YELLOW, COMES THE CLOUD, TEARS, SHOOK AND TWISTED, JUMPED AND DANCED, BARE SKULL, SHAKING, BEST
 765 DATA GETTING HUNGRY, RAIN, GOOD, WIND, CHOKE, YOU, ME, EVERYONE, YEARS, UNEXPECTED, LARGE RED HEN, CROWS, BLACKBIRDS
 770 DATA IN THE CITIES, I BECAME A STONE, BACKWARDS AND FORWARD, GREY, LILAC, ALL THE COLORS, SHAKE IT THIS WAY, MUCH TO HOT, COOK, JOKED, TAKE A HINT
 775 DATA THICK SMOKE, MENDED CLOTHES, BROKEN TEETH, TORN, POOR, READY, WHERE ARE YOU GOING, MANY CHILDREN, FAVORITE, MY CHILD, OPEN
 780 DATA BACKYARD, PICK A FRUIT, @

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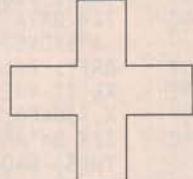
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A multi-purpose text utility for OS-9

Append



by Stephen B. Goldberg

When you want to add a name to your telephone list, wouldn't it be nice to just enter it without having to run your word processor, editor or database program? That is the original purpose of *Append*. It works nicely, but the program has grown into a multi-function utility that can also be used to replace the *build* and *merge* commands. The general syntax for *Append* is

```
append <destination> [source] [...]
```

To add lines to the end of a text file, type *append* followed by the name or pathlist of the file being appended and press **ENTER**. When the plus sign (+) prompt appears, type the line(s) you want to add, pressing **ENTER** after each. When you are finished, press **ENTER** by itself at the + prompt. Here is an example:

```
OS9: append fone ENTER
+ john jones (123) 456-7890 ENTER
+ philip smith (493) 293-4832 ENTER
+ ENTER
```

This adds the telephone numbers of John Jones and Phillip Smith to the end of an

existing file named *fone*. When you execute the program, if the file *fone* doesn't exist, *Append* automatically creates it. In this case it functions exactly like the *build* utility. It even uses the ? prompt in place of the plus sign.

Putting Two and Two Together

If you want to merge several files into one large file, use a command line like

```
OS9: append big_fone family
business friends ENTER
```

OS-9

Listing 1: Append.asm

```
*****
* Three in One
* Written by Stephen Goldberg
* Copyright (c) January 1990
* By Falsoft, Inc.
*
* APPEND
*
* Adds text to end of a text file from the keyboard or
* other files. Also replaces Build and Merge utilities.
*
* Use: append <destination> [source] [...]
* Omit source filename for keyboard input.
* Hyphen (-) given as source filename accepts data from
* unprompted standard input (pipeline or redirection).
*
* Use '#' command line modifier for faster operation.
*
        ifpl
        use    /dd/defs/os9defs
        endc
*
        mod     len.name,prgrm+objct,reen+2,entry.dsiz
*
        flag    rmb    1           prompt flag
        inpath  rmb    1           input path number
        outpath rmb    1           output path number
```

Stephen Goldberg is a dentist and the author of the Utilipak series of OS-9 utilities. He can be contacted at 695 Plainview Road, Bethpage, NY 11714. Please include an SASE when requesting a reply.

```

buffsiz rmb 2 size of buffer
pointer rmb 2 filename pointer
buffer rmb 512 buffer
rmb 200 stack
rmb 200 parameters
dsiz equ .
*
name fcs /Append/
fcb 3 edition number
fcc /(c) January 1990 Falsoft, Inc./
fcc /Written by Stephen B.Goldberg/
*
syntax fcc /Use: append <destination> [source] [...]/
fdb $070a
fcc / use - as source for standard input/
cr fcb $0d
*****
* SYNTAX ERROR PROMPT
*****
bad leax <syntax.pcr syntax prompt
1da #1 standard output
1dy #100 maximum length
os9 i$writeln prompt to screen
1bcs out exit with error
1bra noerr exit append
*****
* INITIALIZE
*****
entry decb parameter?
beq bad no. prompt and quit
stu buffsiz lower data limit
tfr x,d top data limit
subd buffsiz total data size
subd #206 less stack and other data
std buffsiz save buffer size
clr inpath standard input path
clr flag clear prompt flag
*****
* OPEN DESTINATION FILE
*****
stx pointer save parameter pointer
1da #write. write mode
os9 i$open open destination file
bcc savepath no error, continue
cmpb #216 can't find file?
1bne cantopen prompt and exit with other error
1dx pointer pointer to filename
1dd #$020b write mode and attr pr r w
os9 i$create create new file
1bcs cantopen prompt and exit with error
inc flag set '?' prompt flag
pramloop 1db .+ next parameter character
cmpb #20 space?
beq pramloop yes, look for next parameter
leax -1,x reset pointer
savepath sta outpath save output path number
stx pointer save parameter pointer
*****
* GO TO END OF DESTINATION
*****
pshs u,x save registers
1db #ss.size file size function
os9 i$getstt get length of file
bcs out exit with error
os9 i$seek move to end of file
bcs out exit with error
puls u,x retrieve registers
*****
* OPEN SOURCE FILE
*****
1da ,+ next parameter characters
cmpa #'$0d more parameters?
beq chkflag no, use prompt for keyboard entry
com flag yes, set no-prompt flag
cmpa #'- standard input path?
bne openin no, open first source file

```

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trademark of TSC, Inc.

This command creates the file `big_fone` and merges the telephone numbers from the three specified files (`family`, `business` and `friends`) into this file. If `big_fone` already exists, the contents of the three source files are added to the end of its original contents.

Append works nicely, but the program has grown into a multi-function utility that can also be used to replace the build and merge commands.

Any type of file can be merged in this manner, including OS-9 memory modules. You can also use *Append* to merge data from a pipeline or by input re-direction. For example, to add the telephone numbers in a compressed file to your `fone` file use

```
OS9: expand old_fone ! append
fone - ENTER
```

This example assumes you already have the `expand` utility on your system. The `expand` program enlarges the compressed file `old_fone` to the standard output path. This is piped to `append`, along with the destination file, `fone`. When used in place of the source filename, the hyphen (-) tells `append` to accept data from the standard input path without prompts and not to quit at a bare carriage return.

When using *Append* in a mode other than keyboard input, increase the size of the default 512-byte buffer by using the # command line modifier. This increases the speed of operation when appending large files.

```
OS9: append hugefile bigfile
largefile #40k ENTER
```

If you don't have the OS-9 assembler, enter and run the BASIC09 program in Listing 2 to generate the executable program. After a little experimentation, you'll find many uses for *Append*. □

```

chkloop lda .x+
cmpa #$20 next parameter character
blo chkflag end of parameters?
beq chkloop yes, check for prompt
openin ldx pointer not yet, look some more
lda #read. parameter pointer
os9 i$open read mode
bcs cantapnd open source file
sta inpath prompt and quit with error
stx pointer save input path number
***** save parameter pointer

* DATA TRANSFER LOOP
*****
chkflag leax <quest.pcr ?' keyboard prompt
tst flag prompt wanted?
bmi bigin no, get block input
bne doprompt yes, use ?' prompt
leax <plus.pcr else use +' prompt
doprompt lda #1 standard output
ldy #2 two characters
os9 i$writeln prompt to screen
bcs out exit with error
leax buffer.u buffer address
clr a standard input path
ldy #200 maximum line length
os9 i$readln get line from keyboard
bcs error branch on error
cmpy #1 carriage return only?
beq noerr yes, end append
bigout lda outpath destination path number
os9 i$write output to file
bcc chkflag if no error, get next input
cmpb #e$eof end of file?
bne out no, quit with other error
lda inpath input path number
beq noerr standard input, quit append
os9 i$close close input file
bcs out exit with error
ldx pointer parameter pointer
lda ,x next parameter
cmpa #$0d another input file?
bne openin yes, get it
noerr clr b clear error flag
out os9 f$exit end append
*
quest fcc /? / keyboard input prompt
plus fcc /+ / keyboard input prompt
*****
* BLOCK INPUT
*****
bigin ldy buffsiz buffer size
leax buffer.u buffer address
lda inpath input path number
os9 i$read read in block
bcs error branch on error
bra bigout block to destination file
*****
* ERROR MESSAGES
*****
cantapnd leax <noappnd.pcr can't append message
ldy #noapplen message length
bra badinput to screen and quit with error
cantopen ldx pointer parameter pointer
endloop lda ,x filenam character
cmpr #$20 end of filename?
ldy endloop no, look some more
bhi lda #$0d yes, carriage return
sta -1,x to end of filename
leax <noopen.pcr can't open message
ldy #noopenlen length of message
badinput bsr screen2 message to screen
ldx pointer parameter pointer
bsr screen filename(s) to screen
bra out exit with error
*
screen ldy #200 maximum length

```

```

screen2 lda #2           standard error path
          os9 i$writeln message to screen
          bcs out         exit with error
          rts         return
*
noappnd fcc **** Can't append: /
noopen  fcb 7
noapplen equ *-noappnd
         fcc **** Can't open: /
noopelen equ *-noopen
*
         emod
len    equ *
end

```

Listing 2: Make_Append.b09

```

PROCEDURE Make_Append
0000  DIM ByteVar,OutPath:BYTE
000B  DIM Counter,Checksum,LineNumber:INTEGER
001A  DIM ByteString:STRING[2]
0026  DIM DataString:STRING[60]
0032
0033  CREATE #OutPath,"Append":WRITE
0044  LineNumber=100
004B
004C 10  READ DataString
0054  Checksum=1
005B
005C  FOR Counter=1 TO 25
006C  ByteString=MID$(DataString,Counter*2-1,2)
0080
0081  IF ByteString="ZZ" THEN
008F  GOTO 20
0093  ENDIF
0095
0096  ByteVar=VAL("$"+ByteString)
00A4  PUT #OutPath,ByteVar
00AE  Checksum=Checksum+Counter*ASC(ByteString)
00BF  Checksum=Checksum+Counter*ASC(RIGHT$(ByteString,1))
00D3  NEXT Counter
00DE
00DF 20  IF VAL("$"+RIGHT$(DataString,4))<>Checksum THEN
00F8  PRINT "Check error in line "; LineNumber
0114  ENDIF
0116
0117  LineNumber=LineNumber+1
0122
0123  IF ByteString<>"ZZ" THEN
0131  GOTO 10
0135  ENDIF
0137
0138  CLOSE #OutPath
013E  END
0140
0141 100 DATA "87CD01D3000D1182F900B40397417070656EE403286329204A8919"
0181 101 DATA "616E7561727920313939302046616C736F66742C20496E632E8B26"
01C1 102 DATA "5772697474656E206279205374657068656E20422E476F6C648B58"
0201 103 DATA "626572675573653A20617070656E64203C64657374696E6174897D"
0241 104 DATA "696F6E3E205B736F757263655D205B2E2E2E5D070A202020208A17"
0281 105 DATA "20757365202D20617320736F7572636520666F72207374616E88A6"
02C1 106 DATA "6461726420696E7075740D030CAB8601108E0064103F8C102589EC"
0301 107 DATA "00B51600B15A27EAD031F1093038300CEDD030F010F009F058D49"
0341 108 DATA "8602103F84241CC1D8102600AF9E05CC020B103F83102500A38A8D"
0381 109 DATA "0C00E680C12027FA301F97029F053450C602103F8D256E103F8C57"
03C1 110 DATA "8825693550A680810D271B0300812D2608A6808120250F27F889B0"
0401 111 DATA "9E058601103F84255F97019F05308C460D002B462603308C3F8AD0"
0441 112 DATA "8601108E002103F8C252F30474F108E00C8103F8B250108C8C82"
0481 113 DATA "0001271C9602103F8A24D0C1D326129601270D103F8F25099E8C60"
04C1 114 DATA "05A684810D26AE5F103F063F202B20109E0330479601103F898955"
0501 115 DATA "25D720CE308C2D108E001420139E05A680812022FA860DA71F8D50"
0541 116 DATA "308C2B108E00128D0A9E058D0220C7108E00C88602103F8C2588B4"
0581 117 DATA "BC392A2A2A2043616E277420617070656E643A20072A2A2A8A4E"
05C1 118 DATA "2A2043616E2774206F70656E3A20E7DF59Z24414"

```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful, helpful and fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you want to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs that can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included in ASCII format on the tape or disk, using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those wanting more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

Reviews

Game

CoCo 3

Space Ace

Space Ace is an action-arcade game written for the 128K or 512K CoCo 3. Requirements for operation include a disk drive and a joystick. Although it looks acceptable on a color composite monitor, *Space Ace* looks great on an RGB monitor. The game is written in 100-percent machine language and has smooth Hi-Res graphics as well as fast action. It's supplied on a single, unprotected 5½-inch disk and comes with three and a half pages of simple instructions. To begin playing, enter LOADM "X1":EXEC.

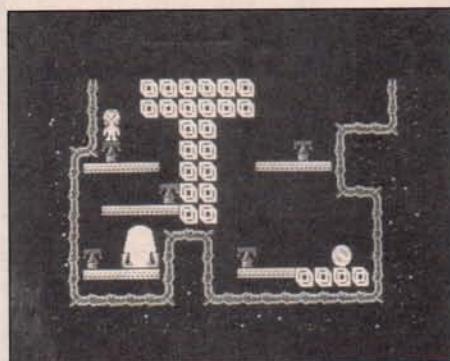
Space Ace is the story of a friendly computer turned bad. It all transpired during a period of several hundred years when the galactic master computer, Iravo, began creating robotic drone guards and mercenaries. You are *Space Ace*, a human dressed in a robot suit. This disguise was necessary to infiltrate the starbase and destroy Iravo. Iravo has successfully taken over all four galaxies whose inhabitants now live a fearful existence in slave colonies. As Ace, you must rescue these people. To accomplish this task, Ace has an Iravo Class-2 Scout spaceship with various weapons, and the knowledge to complete this very dangerous mission.

A countdown starts at 10 and decreases after the loss of every third life. If the countdown reaches zero, you must start over. These 30 lives seem generous, but you will soon discover this mission's complexity. On this mission you are confronted by drone guards, orbs and power orbs. Use the joystick to maneuver through the four zones in the starbase. (A self-centering joystick is highly recommended.) Each zone contains computer terminals and is divided into rooms. Walk to the edge of the screen to enter the next room. Rooms above or below the playing screen are accessible with elevator platforms.

Throughout the mission there are several screen options from which to choose. Scan searches your remaining orbs. This option can be used only from certain terminals. You must discover the exact terminals. Be warned, some orbs are deadly when scanned. Item selects the weapon you want activated. Call shows your score, number of lives left and power level. Quit resumes play.

Other items of interest include power

orbs, lasers and telepod keys to instantly go from zone to zone. A Super Jump command is also available for high jumps. The anti-explosion device prevents orb explosions during scanning. Be careful not to fall or jump into outer space. To win the game you must explore the entire starbase, find the needed orbs and gain access to the master computer. In addition to Pause and Continue features, *Space Ace* includes a Game Save so you can get some rest and resume play after a good night's sleep.



Space Ace is quality fun. It's full of unexpected thrills and situations that will leave you breathless. The graphics and sound effects are good, though game play is slowed down slightly when going from one room to another.

(Biware Enterprises, c/o Kandi Stinson, P.O. Box 265, Allen, OK 74825; \$20)

— Robert Gray

Utility

CoCo 3

Scripteller

I was asked to review a new program for handwriting analysis. This was my chance to play graphologist and discover the hidden messages conveyed through handwriting. I chose to study my co-workers. What are these people really like? As the first of these analyses began, I was filled with anticipation as to what I would learn.

Scripteller is a program for handwriting analysis on the CoCo 3 with a disk drive. The program is easy to use and is designed to give a general psychological portrait of a person from a sample of their writing. The package includes an instruction manual that clearly states the directions for and purpose of this program. The claims made

in this manual are of limited greatness. The program claims to approach the accuracy of the expert graphologist, but cannot accept responsibility for inaccurate interpretations due to the possibility of inaccurate user responses.

To run the program, type RUN"S" and ENTER. It really is that simple. This program is perfect for the computer novice or the genius whose brain needs a vacation. The menu offers five options: analyze, load, save, interpret and quit. To analyze a handwriting sample, select Option 1 and answer the series of questions that follows. Examples of questions include the size, slant and width of the writing, the width of both left and right margins, space between lines of writing and the way the subject dots the i. When the analysis has ended, you are prompted to press ENTER to return to the menu. From here you can select any of the remaining options. To interpret the information, select Option 4. The results of the analysis can be viewed either on the screen or in printed form.

The interpretation lists the handwriting factors and the corresponding personality characteristics. These characteristics are generated from the answers given in the analysis and should vary based on these answers. I repeat, they *should* vary based on these answers. During my experimentation, some of these computer-generated characteristics remained the same regardless of the response to the corresponding question. I am also puzzled by the combined characteristics that appear at the end of the interpretation. In my analyses these characteristics varied in number from one to five. And, with my limited knowledge of graphology, seemed nothing more than randomly generated personality characteristics with little relationship to the preceding information.

Some of these interpretations, like "average in many ways" and "normalcy" are neither complimentary nor derogatory, but remain in a plane of unexplained ambiguity. Other interpretations such as "energetic and flexible," "polite" immediately followed by "selfish" and "sensuality, exaggeration" are contradictory groupings that further obstruct the view to one's personality. Based on my experience with this program, I recommend *Scripteller* be used strictly for entertainment and not as irrefutable evidence in a courtroom. I can see no application for this program beyond its capacity for limited entertainment.

Scripteller is not the re-invention of the



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wheel. It is not perfect. It does not push computer technology to new and unexplored limits or require users with intellectual superiority. It operates without bright colors or spectacular graphics. There are no warriors, damsels, dragons, castles or moats. Just an unassuming program quietly demanding the attention and respect given to its dazzling cousins. *Scripteller* is proof that entertainment need not be all flash and pizazz.

(E.Z. Friendly Software, 118 Corlies Avenue, Poughkeepsie, NY 12601; 914-485-8150; \$26.95 plus \$1.50 S/H)

— Rob Moore

Software

CoCo 1, 2 & 3

T&D Software Issues #91 & #92

Are you a newcomer to the CoCo world, bright-eyed and full of curiosity about what this sleek machine is capable of? Or are you a seasoned CoCo user, thoroughly familiar with word processors and databases and perhaps even BASIC? No matter what your level of experience, there's a product from T&D Subscription Software that may add variety (and a few surprises) to your computing life.

Twelve times a year, T&D Subscription Software releases a disk and cassette filled with CoCo 1, 2 and 3 programs. Each disk/cassette provides a collection of different programs that offer everything from help for the CoCo user, to general instruction, to just plain fun.

Included are business and personal productivity programs, instructional tutorials, CoCo utilities, game puzzles, text and arcade-style games, as well as educational programs for children. All the subscription programs are original (i.e., none of them come from public domain software). Disks/cassettes may be ordered individually (all issues are still available), or you may sign up for a year's subscription that includes twelve disks, one per month, at a discount off the single-issue price.

While some T&D Subscription Software programs require a disk drive, the cassette tape issues still include these programs for users who may eventually upgrade to a disk drive. My review examines last year's first two disk issues: #91 (January 1990) and #92 (February 1990).

Each T&D Subscription Software disk comes labeled with a directory of its con-

tents and includes a page of instructions. T&D tells me that with each order it includes an additional page of instructions to help beginners get started. I found it easy to get the programs up and running as soon as I made disk back-up copies and safely stored the originals.

Both issues have 10 different programs, all written for the CoCo BASIC environment (none of the programs can be used directly under the OS-9 operating system). By typing RUN "DIR", you engage a directory utility program that comes with each T&D Subscription Software disk. This helpful program creates a listing of programs on disk, and it allows you to select and run programs with just a few keystrokes. With documentation in hand, I found it a simple matter to locate programs in the disk directory and relate them to their place in the instructions. The instructions include an explanatory paragraph for each program, with each paragraph labeled for quick reference. If you require further instructions, many programs include onscreen instructions that are viewed from within the program itself.

With all these programs before me, I had a difficult time deciding which one to run first. I ran a BASIC program called *Address It*. This is a menu-driven tutorial for the 32-column screen that addresses the question of addresses: What are the proper forms of addresses for 107 different public officials? The program contains eight pages of information accessible from a two page menu. Next I tried a BASIC game puzzle called *Solitaire*. This *Othello*-like puzzle involves strategically maneuvering around different colored chips on a grid. It is a simple but seductively challenging game. I then tried a personal productivity program, *Builder's Helper*, which allows you to add, subtract and multiply feet, inches and fractions of an inch.

Next I discovered somewhat more elaborate programs. For instance, *Business Starter* is a menu-driven program that assists you in creating and printing out a business plan; it even offers advice for seeking a bank loan. Another fancy program is a database for keeping track of a baseball card collection. In addition, I found a very educational tutorial that outlines the differences between IBM PC BASIC and CoCo BASIC. Among the games are several all-text, adventure-style games, plus a number of arcade-style games (including a Tom Mix creation called *SkyWay*) that require quick reflexes.

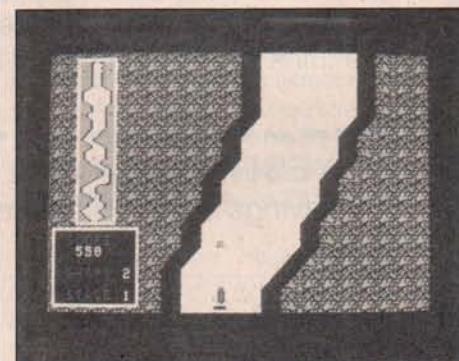
Each program I tried is simple, to the point, and in all cases performs as advertised. The breakdown of the programs in my two issues went like this: With ten programs apiece, each disk averaged six games, two tutorials, one productivity aid and one CoCo utility. On the average, two

programs require a 128K CoCo 3, while many others require a minimum 32K to run. A joystick is required to play some of the games. In all cases documentation is very thorough regarding program requirements. While you need a CoCo 3 with an RGB monitor and disk drive to run *all* the programs to their fullest potential, for most programs, a tape-based 32K CoCo 1 with a television monitor is adequate.

Technically speaking, these two issues contain programs that are an even mix of routines written entirely in BASIC (DECB) and BASIC programs that use ML subroutines. Two of the programs are all machine language. Both disks have basically the same distribution of software, each containing programs for CoCo 1, 2 and 3.

Overall I am impressed with this software-subscription service. Most of the programs are short and simple, yet they are useful, entertaining and cleverly written. All the programs live up to a high level of quality and reliability — obviously they were carefully selected and reviewed by T&D Subscription Software prior to release. The documentation is well-written and to the point, with unwavering attention to important details.

Being basically satisfied with the whole T&D Subscription Software package, the only reservation I have is that some of these programs are so simple, I question their usefulness. One such program is a word/picture association quiz that displays PMODE drawings of various wild animals (at times hard to identify because of poor framing). You are to select the appropriate animal name. It isn't clear what age or skill level this quiz is targeted for.



Regarding the games, I think some (especially the arcade-style games) run intolerably slow and are hard to control accurately with a joystick. A few games ask at the beginning if you want the CoCo 3 high-speed poke, but even these are slow runners. Helpful features such as game pause and move cancel are often omitted, and none of the games are written to save scores to disk — a feature I find important for any game. Regarding programming, the

only flaw I found (and a minor one at that) is that some programs did not load properly from the DIR utility. (I simply loaded and ran them from BASIC.)

On the up side, T&D Subscription Software is a very rich resource for the budding BASIC programmer. Since many of the programs are written entirely in BASIC, they can be loaded and listed like any standard BASIC program. Here is an opportunity for the programming student to study the work of programming professionals (keeping in mind of course that no copyrighted program may be copied in whole or in part and resold without the author/copyrighter's permission).

Even with my limited programming abilities, I found it easy to reconfigure some of the BASIC programs for my CoCo 3, RGB system. I used the CoCo's built-in EDIT command to adjust a program's screen colors, and insert ON BREAK GOTOS and high-speed pokes where appropriate.

T&D Subscription Software offers a little something every month for everyone; however, don't expect to find elaborate, heavy-duty spreadsheets or complex, lightning-fast arcade games. This is definitely compact, single-purpose software territory. But at the very reasonable, non-subscription price of \$8 per issue, you're bound to get more than your money's worth.

(T&D Subscription Software, 2490 Miles Standish Drive, Holland, MI 49424, 616-399-9648; \$8 per issue, \$70 for a one-year subscription)

— Walter Myers

Database

CoCo 1, 2 & 3

Mailman

With the many advances in computer technology in the last few years, it is easy to lose sight of the more mundane tasks we can relegate to the computer. How many of us slave over handwritten addresses for greeting cards during the holiday season? *Mailman*, a mailing-list organizer from Johnson Software, is a no-frills workhorse that puts that task on the CoCo where it belongs.

Of course, addressing greeting cards is just one of many chores for *Mailman*. This type of program may be even more useful

to those with small businesses or organizing mailings for churches, clubs and other groups. Although the program is designed for mailing purposes, it incorporates a free-form database structure. You can use *Mailman* for many other filing tasks as well.

Mailman is a series of related programs that works on any CoCo with Extended BASIC, at least 32K RAM and a disk drive. As sold, the system is set up to run on a CoCo 3 with one drive and a printer set at 600 baud. Reconfigure the system for your CoCo setup by making simple changes to a BASIC driver program. These changes are well-documented in the 35-page manual that accompanies *Mailman*.

After running the driver program, you are greeted with a short menu. From here select options for Printer Output, File Management and Record Management.

The File Management menu allows you to add, delete and copy files. Use the Add option to create your own mailing list or database record forms. Each record in a file may contain up to 1530 characters. Once you have created the new file, pressing CLEAR takes you back to the main menu. CLEAR is *Mailman*'s hot key for breaking out of a function or returning to previous menus.

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Magazine Source: Due to many inquiries, the source code for the magazine graphic shell is being provided as an informational tool. Included is the actual BasicOS9 source code and compiled modules on disk, as well as documentation and a printed copy of the source code.

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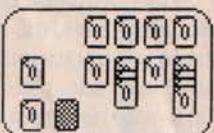
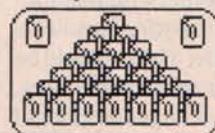
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To add data to a created file, select the Record Management option. A new menu appears with options to add, order (sort), scroll through, delete and insert records. You can also fetch a single record from a file for reference or editing.

The Add, Edit and Insert modes bring up a free-form screen on which you enter the data. This full-screen editor works well as an input device. I did, however, find the omission of an editing Insert function a little disappointing.

Mailman allows you to sort records alphabetically, by postal ZIP code or by date. When sorting alphabetically, the program starts at the first character of each record and moves on. When sorting by ZIP code, or a user-defined five-digit sorting code, *Mailman* first goes to the end of the record. It then searches backward for the first complete five-digit number, which it uses to sort. Since the free-form records don't use traditional fields, you must take care that the ZIP code, or other sort number, is the last five-digit number in each record. This is limiting in some cases and desirable in others. However, an obvious drawback to this arrangement is that Canadian addresses cannot be sorted correctly by ZIP code. Nine-digit extended U.S. ZIP codes work fine except that the last four digits are not sorted correctly. Because of the methods used and the limitations of BASIC, sorting speed is not impressive. It took four minutes to sort a file of 69 records.

While *Mailman* can otherwise manipulate larger files, the sort routine handles a maximum of 1500 records, which should be more than adequate for most home uses. Users who need to store a larger number of records can easily circumvent this by splitting mailing lists or databases into logical groups of records.

Mailman's printing capabilities are excellent. Since the system doesn't use special control codes, most any printer can be used for output. The Repeating Record feature allows you to enter a single record to be printed along with each record from a file. This practical feature is great for printing a return address on labels.

Other print features include right justification and left margin adjustments, multiple prints and the ability to print all, or a limited range, of records. You can also set the top-of-form code, which is the number of printed lines to put on a given form. If you are printing on six-line labels, you should be able to enter 6 for this value. (A standard page allows 66 lines.) Unfortunately, due to what I believe is an error in logic, I had to enter 7 to print on six-line labels and 13 for 12-line labels. A quick program change should be all that is necessary to eliminate this problem.

The Print At Record Entry (PARE) feature allows you to print a record (and a repeating record, if desired) when the record is entered into the file. This eliminates the need to call *Mailman's* Printer Output menu separately. Those in a product-oriented business will find this time-saver quite handy.

All in all, I was impressed by *Mailman's* capabilities. The manual includes an excellent tutorial, as well as technical information on all features. I encountered no bugs or problems other than the previously mentioned top-of-form inaccuracy.

Mailman isn't flashy and uses no special effects. It just does the job it was designed to do; make life, or work, a little easier for its users.

(Johnson Software, P.O. Box 92, Dayton, OH 45449; 513-866-2601; \$23.95 plus \$2.50 S/H)

— Cray Augsburg

Music

CoCo 3

SoundTrax

There are many CoCo music programs on the market. Several of these programs require a MIDI-compatible keyboard to enhance sound quality. Some of the music programs not requiring a MIDI interface lack exciting instrumentation. Sundog Systems is working to fill this void with a new product called *SoundTrax*.

SoundTrax is a sound-sequencing system for the CoCo 3. With a CoCo 3, a disk drive and a mouse or joystick, you can create lively compositions.



SoundTrax boots from any drive. The program features a graphics user interface (GUI) consisting of five pull-down menus, a four-track composition field, measure and block boxes, two keyboards with voice display boxes, a play mode indicator and a metronome box.

First, load the voices into memory. A

variety of voices are available for use from the flip side of the *SoundTrax* program disk. Select the appropriate voices and load them individually using the Load Voice option in the File pull-down menu. After loading all necessary voices, you can select Save Config. If the config file is named DEFAULT.CFG, the selected voices will be loaded every time you boot *SoundTrax*. This option saves a lot of time.

With a 512K system it's possible to load all of the supplied voices into memory. Memory limitations prevent operation of this feature with a 128K computer. Save needed voices with the above-mentioned Config option. When you select a song to play, all the voices needed to recreate the song are automatically loaded. If the voices can't be found on the default drive, you'll be prompted to change to the drive where these voices reside or you can insert the voice disk into the default drive and click on the drive number.

You are probably wondering how to create music with this program. *SoundTrax* is a four-track recording environment. Two voices can be recorded at once to the same track or to separate tracks. Pick an instrument voice from the upper keyboard and one from the lower keyboard. These keyboards have preassigned keys, each spanning one full octave. Notes from either can be played on the CoCo keyboard.

After selecting a block, length of measures and the destination track numbers for both upper and lower keyboards, the music entered on your CoCo keyboard is recorded. Choose a time signature. Also, a metronome keeps the beat in accordance with the tempo.

I started a back beat with a rock-snare drum and bass guitar. The drums were recorded to Track 1 and the bass guitar to Track 2. I then merged both tracks to Track 1. Erasure of Track 2 allows for the recording of a new voice. By merging tracks it becomes possible to have many voices (polyphonic) in one song.

Selecting new voices for the keyboards allows for more voices in your recording. Supplied on disk are voices for piano, guitar, bass, horn, drums, wind instruments and many other useful sounds. The sound quality of these voices is much better than I expected. More instrument sample disks are available from Sundog Systems. Sample these voices by loading them into the keyboards and selecting Playthrough from the Options menu.

SoundTrax supports files created with Studio Works and interpolates the rate automatically. It can also read sounds from other sources as long as the files are no larger than 16K.

Your recording is displayed in a compo-

sition field containing all four tracks. Music is represented by broken lines in the associated tracks. It requires adjustment to read music in this format rather than the usual stave. Writing music with *SoundTrax* reminded me of past experiences programming drum machines. Programming is done mostly by ear and not by sight. You can see where music is located, but not the specific notes being played. Once familiar with the layout, though, things run smoothly.

Recording every track to perfection is difficult; at least it was for me. There are editing commands to reshape your compositions. Block editing commands include Copy, Paste, Erase, Add, Set and Cut Block. Add lets you add measures to an existing score. Track editing commands include Merge, Erase, Copy and Sync. Sync will try to put a track in closer synchronization with the metronome. It's advisable to copy the block to the clipboard before editing to ensure that all is not lost if the results of a new mix are not acceptable. The manual provides a tutorial to get you started.

SoundTrax is very entertaining. If you're not in the market to purchase a MIDI keyboard to use in conjunction with a CoCo music program, give *SoundTrax* consideration. The price is affordable for most CoCo users. Here's another outlet for your

creativity on those cold winter nights. Maestro, music please.

(**Sundog Systems, P.O. Box 766, Manassas, VA 22111, 703-330-8989; \$34.95 plus \$2.50 S/H**)

— Tony Olive

Utility 512K

CoCo 3

512K Copy Utility

Are your fingers sore from copying files to a new disk? Tired of waiting for a backup to finish? Have you ever wondered if there's a faster way to format disks? With *512K Copy Utility* from Carl England you can spend more time using programs, rather than wasting all day moving them.

If you use BASIC's COPY command to transfer files to new disks, then you routinely type source filename and destination filename. Moving one file at a time is tedious work. *512K Copy Utility* allows tagging of multiple files resulting in quicker transfers.

A configuration program is provided so you can set default parameters for this

utility. Defaults can also be changed from within the main program.

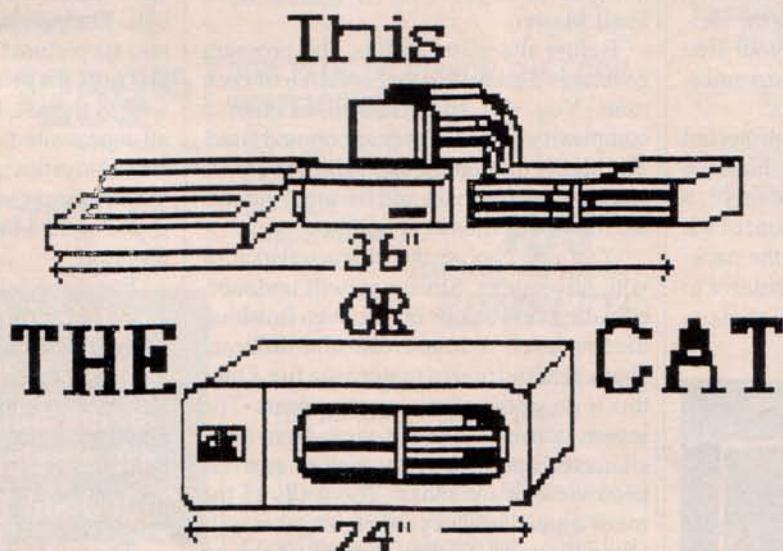
Select a source drive by pressing S and then 0, 1, 2 or 3 accordingly. Do the same for the destination drive by pressing D and a drive number. Pressing the space bar on the desired file places an asterisk in front of the filename. Use the arrow keys and move the on-screen cursor to mark additional files. Pressing ENTER executes the copying. Options also exist for copying all files and copying all files except tagged files. Files are loaded into RAM prior to being copied. Single-drive users are given a prompt to swap disks.

512K Copy Utility alleviates typing of file names. When files need to be renamed, pressing R allows you to change selected characters positioned above the cursor in an existing filename.

A word of caution: This utility allows copying of identical filenames to the destination disk. Identical filenames should be changed so that BASIC can distinguish between them.

Copying between different track drives is no problem. The destination drive can be set for 35, 36, 40 or 80 tracks. It isn't necessary to set the number of tracks for the source drive.

You can kill files by pressing K and



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format disks by pressing F. Safety prompts confirm these commands before they are executed. Formatting disks using *512K Copy Utility* is 25 percent faster than with DSKINI.

The commands for this program are easy to remember. There is hardly any learning curve to speak of. One minor option is not listed in the manual. After you load the self-executing machine-language file, a command-options page appears. Pressing any key exits this page and your source directory appears on screen. Pressing the Reset button returns you to the options page.

These utilities are fast and easy to use. They are convenient for those wanting to re-organize their disk libraries. The price makes this package a real bargain.

(Carl England, 128 Sheperd Dr. N.E., Calhoun, GA 30701, 404-629-7197; \$15)

— Tony Olive

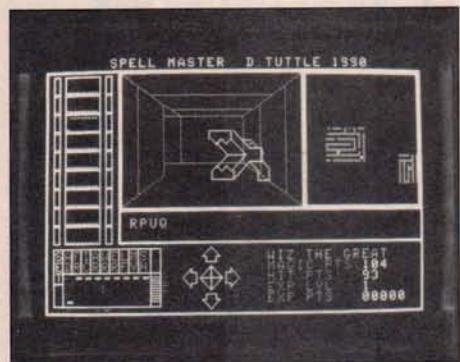
Game

CoCo 3

Spell Master

Spell Master will be a great disappointment to those of you looking for a good program to check and correct spelling errors. But, if you are bored since cracking the Chinese Military Code during the Beijing freedom uprising or spend your free time deciphering bar codes in supermarkets, then *Spell Master* is for you.

For \$18 you get a non copy-protected disk and half a page of booting hints. A Coco 3 with at least 128K, a disk drive, a joystick as well as an infinite amount of wit and patience are not included in the package, but are required for the adventurer to gain admittance to the Plane of Non-Existence in this graphics adventure.



Unlike most adventures, you can't buy, borrow or steal weapons to defend yourself from monsters waiting in the dungeons. Your only chance for survival is to cast magic spells that may or may not protect

you from these monsters. To make things more challenging for those blessed with inordinate memory, keep in mind that while all invisible monsters look alike, their characteristics are different. Therefore, the

The object of the game is to battle against nasty, disgusting, obnoxious and not very nice monsters and navigate through 10 levels to become a Spell Master.

successful defeat of one monster with a spell, does not necessarily mean the defeat of all monsters with that same spell. But don't despair, there are supposedly 100,000,000 attack spells and an equal number of defense spells to help in your quest. This reviewer did not check to see if the count was accurate.

The object of the game is to battle against an infinite number of nasty, disgusting, obnoxious and not very nice monsters and navigate through 10 levels to become a Spell Master.

Before the game begins, the program generates a game file that is different each time. You will be prompted to enter a complexity factor between one and nine. The higher the complexity factor, the more complicated the maze and the more vicious the numerous monsters will be.

You can choose the characteristics of your adventurer. Since you will undoubtedly die many deaths before even finishing the first level, you can create nine different characters and mazes to store in a file. Once this is done, the game screen appears. The screen consists of a 3-D view from your character's perspective as well as an overhead view of the maze. The walls of the maze appear only as your character travels along them, so finding the exit is not an easy task.

The only thing left is to create your spells. All movement, including the creation and casting of spells, is accomplished by joystick. Just move the cursor to the desired icon and press the fire button. There are nine spells at your command. These can be changed as often as necessary. Each spell has eight categories and an attack/defense switch. Mix various doses of Fire, Ice, Air, Water, Earth, Life, Movement and

Senses to customize the aforementioned 100,000,000 spells. The successful adventurer is he who can keep track of which spell is effective against which creatures. It is advisable to have paper and pencil at hand.

The game is very complex and comes with an instruction file that can be loaded and printed with any word processor. Even with the instructions, the novice adventurer will find *Spell Master* trying and frustrating. It is especially frustrating to re-boot the game after the death of each character. The game would be more enjoyable if the first couple of levels were less complicated and the character had more lives. But for the avid, hard-nosed, die-hard adventurer, *Spell Master* is a nice addition to the software library.

(Daniel Tuttle, 325 Hillsown Road, Manchester, CT 06040, 203-643-1072; \$18)

— George Aftamonow

Graphics

CoCo 3

NFL Helmets Scrapbook

NFL Helmets Scrapbook is a display of all 28 helmets found in professional football. The program is conveniently broken into six picture files, each representing one division; the NFL East, West and Central, as well as the AFL East, West and Central are all represented. A CoCo 3, *CoCo Max III* and a joystick, or mouse, are needed to view the images. A printer is also required if you want a hardcopy of a sketch on the monitor.

For those who are unfamiliar with the *CoCo Max III* program, it allows sections of an existing picture to be cut, edited, moved and saved as a scrapbook page in order to be pasted into another graphics screen. *NFL Helmets Scrapbook* displays four or five helmets per screen from which any one, or all, can be cut out and inserted in a graphics design of your own creation.

The *NFL Helmets Scrapbook* disk comes with a one-page manual that adequately describes the step-by-step procedures of how to load, cut, paste and move a picture. The manual also has another page that displays all 28 helmets. You can identify the different team helmets even though the finer details are lacking.

Although the documentation does not suggest any applications for this program, we were able to create some suggestions for our own use. One idea is to use a

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letterhead, or eye catching address label, that can be further enhanced by the many available fonts that come with the *CoCo Max III* software. Helmet images can also be printed, then physically cut out and glued to books, toys and lunchboxes. And since all drawings are in black and white, each page can also serve as a coloring book. This should keep youngsters occupied for hours. *NFL Helmets Scrapbook* is reasonably priced at \$10.

(Kathy Rumpel, Route 1, Box 67 A, Arcadia, WI 54612; \$10)

— George Aftamonow

Utility

CoCo 1, 2 & 3

StarPic

StarPic Picture Utility claims to be a total PMODE4, picture-printing program designed for use with the Star NX-1000 dot-matrix printers. These claims might be true, but the first impressions can be very different.

This utility comes on a single disk with

a one-sheet manual. It contains an upgrade addendum for Version 2.3 that addresses *StarPic Picture Utility*, *DMP Picture Utility* and *GEM Picture Utility*. The upgrade addendum is on a separate sheet, which destroys the manual's continuity.

Starpic has three pull-down menus (Disk, Baud and Goodies) across the top of the main screen displaying the available picture files.

StarPic works on any CoCo with 64K RAM and a disk drive. According to the manual, the program uses the right joystick for choosing pictures. The manual fails to clearly state that the joystick is mandatory. You cannot use the program without a joystick. I suggest using a free-floating joystick rather than a self-centering one.

The interface is similar to a Macintosh graphics user interface. Move the cursor with the right joystick to select from a list of pictures or activate pull-down menus to choose different options.

When loading, *StarPic* checks the disk for picture files with the extension of .MAX and lists them in the file window. Files without a .MAX extension are not recognized by *StarPic*. Save your home-brew PMODE4 pictures on disk from \$E00 to \$25FF with an extension of .MAX. Double-screen pictures need to be saved from \$E00 to \$3DFF.

No mention of how to save a file is made in the manual until the second

page, fourth paragraph, under a note about the error message for an off-line printer. As a computer support specialist I have found that the easier the interface, the less a user must know about getting the program running. And the easier it is to work. It would be great if *StarPic* would allow you to save that screen to disk with a user-specified filename by tagging on it the needed .MAX extension. A section of the manual should be dedicated to explaining what a user needs to know about saving and loading PMODE4 files in BASIC.

The program does give an example of how to make a double-screen picture one screen long. To do this, load the picture from disk with LOADM "filename.MAX", then resave the file with SAVEM "filename.MAX", &H0E00, &H25FF, &HA027. Why not tell the user that he can use that same SAVEM command to save a PMODE4 screen in memory to disk? I wish program authors would remember the novice when writing their programs.

StarPic has three pull-down menus (Disk, Baud and Goodies) across the top of the main screen displaying the available picture files. At the bottom of the screen, a Help bar hints at the required action or presents messages such as Select File, Loading Filename or Select Menu Item. Place the cursor over the filename you want to load and press the fire button. The Help bar displays Loading Filename and the picture appears on screen. If you attempt to load a picture that was originally saved in the wrong format, you receive an error message.

The Disk menu allows you to select the default drive (0, 1, 2 or 3). You can place the program in Drive 0 with its demo files and a second disk of picture files in Drive 1. The New Disk choice allows you to read a new disk you have put into the active drive. Use the Drive=x choice to set the destination drive for disk saves. The menu indicates the active picture and destination drive by placing (=) next to the drive listings. There is also an About selection that displays the title screen. The menus show inactive choices in gray. The Disk menu grays two file choices, Compress and Save Pic, until a file is loaded.

Compress saves the loaded picture in a compressed format with a .CMX extension. This allows the file to take up less disk space. This mode works only with *StarPic*. One warning, *StarPic* will acknowledge only the first 36 pictures on a disk. Any files above that number will not appear in the menu. Save Pic saves the loaded picture in a non-compressed format. Quit exits the program.

The second pull-down menu is Baud. This menu allows you to change the baud to

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600, 1200, 2400, 4800 or 9600. Again, an equals sign (=) shows which choice is active.

Goodies is the last pull-down menu, and it allows you to play with the loaded picture. If you have loaded a double-screen picture, use the joystick to scroll around to view the entire screen. Show Page views the present file. You can exit the picture view by pressing the fire button and select Change Mode from the menu or press the space bar to toggle the picture between four graphics modes. For the CoCo 3, the author set up the palettes to simulate the older CoCos' four-color artifact mode in modes 3 and 4.

Com Picture, or pressing Enter in the view screen, complements the picture. This actually makes all the pixels on the screen change. In other words, this inverts the picture. Black changes to white and blue changes to red, etc. You can choose Swap Colors from the menu to swap red and blue, while leaving black and white the same. This choice seems to do the same thing as the Change Mode/space bar except the colors change in a painting movement. You can also activate this feature by pressing S.

Hor Flip and Vert Flip menu selections rotate the picture 180 degrees horizontally and vertically, respectively. You can flip the picture while viewing by pressing H or

V. These functions work only on single-screen pictures — the choices will be gray on the menu when a double-screen picture is loaded. The Mirror Flip menu selection works on either single- or double-screen pictures. This function does a horizontal flip which is handy for T-shirt transfers. Pressing M while viewing also activates this function. The manual states Mirror Flip is for black & white pictures only. It functions on color pictures in the same way as the Hor Flip, but the colors are reversed as if you had pressed the space bar.

The next two menu selections control Walk Around, an automatic slide show. Choosing Walk Around cycles through each file on disk, flashing the picture on screen for the amount of time specified by Walk time=x. In this function X equals the number of seconds each file will be viewed during Walk Around; a value of 0 translates to about 1 second and a value of 9 is 22 seconds.

The last two menu items are the printing utility functions. Small Print produces a 3"-by-3" copy of the picture. Double-screen pictures are printed automatically without any paper alignment. Small print makes some nice, high-quality pictures very quickly. The Large Print selection first checks for double screen pictures. A double-

screen picture is printed on a full sheet in portrait (upright) mode, while a single-screen picture fills a full sheet in landscape (sideways) mode. Both printing functions check and notify you if your printer is off-line. Once printing has started, the only way to abort is by turning off the CoCo.

StarPic can be used on all CoCos but does not take advantage of the CoCo 3's enhanced graphics capabilities.

The program uses the Star NX-1000 dot-matrix printer and allows you to see four colors on screen; blue, red, white and black. But it does not translate these colors for screen dumps. *StarPic* is a black and white screen dump program for PMODE4 screens.

The program lives up to its claims. Once the picture is on disk in the correct format, it is easy to load and print. You can flip the picture and print it reduced or on a full page. *StarPic* is of no use to a CoCo 3 owner working exclusively with Hi-Res graphics. If you own an NX-1000 and a CoCo, and don't need to work with the CoCo 3's enhanced graphics, *StarPic* should be all you will ever need.

(Second City Software, P.O. Box 72956, Roselle, IL 60172, 312-653-5610; \$19.95)

— Kay Cornwell

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La Belle Lucie, a solitaire card game sometimes known as "Three Shuffles and a Cheat." The entire pack of cards is used in the initial setup by setting all cards face up in overlapping trios. Cards are played onto the tableau in descending order within the same suit. The object of the game is to get all 52 cards onto the foundation. You have three deals in order to accomplish this. The game features full-color graphics. Requires a CoCo 3, a disk drive and a joystick or mouse. *Eversoft Games Ltd, P.O. Box 3354, Arlington, WA 98223, (206) 653-5263; \$14.95 plus \$2 S/H.*

Level II Tools, a set of 25 utilities that are useful in the day-to-day usage of OS-9 Level II. Commands are included for wild cards, directory structures, command files, pipe filters, utilities, color manipulation, and window handling. Requires OS-9 Level II. *Alpha Software Technologies, 210 Bluefield Drive, Slidell, LA 70458, (601) 688-3140; \$24.95 plus \$3 S/H.*

File Recovery System, restores "lost" OS-9 files and directories by rebuilding their directory entries or file descriptor sectors. Works on any type of OS-9 disk including RAM disks, floppy disk, and hard disks. Command line options allow *Recover* to display file recovery actions without actually modifying the disk. Requires OS-9 Level I or Level II with at least 24K of free memory and one drive. *Burke & Burke, P.O. Box 733, Maple Valley, WA 98038, (800) 237-2409; \$24.95 plus min. \$3 S/H US, min. \$4 S/H Cdn.*

CoCo Archiver, a disk-file manager and archiver for Disk BASIC. Lists archive files with descriptive memos. Copies, kills, and renames files. Includes a help screen. Shareware feature provided for BBS use. *Danosoft, P.O. Box 124, Station A, Mississauga, L5A 2Z7 ONT, (416) 897-0121; \$17.95 US; \$20.80 Cdn., plus \$2.50 S/H, Ontario Residents add 8% Tax.*

Graphics Utility, a tutorial on how to store multiple Hi-Res graphics screens in CoCo 3 memory for instant recall and how to save and load them from disk. Requires a CoCo 3. Numerous remarks in program listing to understand routines used. *Danosoft, P.O. Box 124, Station A, Mississauga, L5A 2Z7 ONT, (416) 897-0121; \$8.95 US; \$10.50 Cdn., plus \$2.50 S/H, Ontario Residents add 8% Tax.*

Funstats, a general statistics program for a CoCo 1, 2 or 3 with at least 32K. Fifty different statistical programs are contained in this package. Just enter numbers and the computer calculates the statistics. You should have some knowledge of statistical formulas. *Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453, (618) 457-5258; \$39.95 plus \$3 S/H.*

CoCo Calculator, converts your computer into a calculator. Use it for addition, subtraction, multiplication, division, square roots, powers, rates and percentages. Has seven memory banks for the storage of constants and intermediate results. Additional features include a counter and commands for the setting and rounding of decimal places. Requires 16K of

memory. For the CoCo 1, 2 or 3. *Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453, (618) 457-5258; \$14.95 plus \$3 S/H.*

CoCo Labels, creates a double-column, multi-page screen index. Printout one, all or many copies of the same label. Print each line in a different font using a Tandy printer. Requires 32K. *Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453, (618) 457-5258; \$29.95 plus \$3 S/H.*

Bankman, menu-driven program for continuously updating your checkbook. Allows you to keep a running record of deposits, checks and accounts. Files can be saved edited and printed. Lets you reconcile and analyze particular accounts. Requires 32K CoCo 1, 2 or 3. *Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453, (618) 457-5258; \$39.95 plus \$3 S/H.*

Brainbusters Test Writer, Design multiple-choice and true/false questions. Allows you to edit, save, load, select, display, randomize and print. Includes utilities for making a cover sheet, answer key and instructions. Requires 32K. *Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453, (618) 457-5258; \$39.95 plus \$3 S/H.*

Brainbuster Examiner, permits Brainbuster quizzes to be taken onscreen rather than in written form. For classroom, home or office. Requires 32K. *Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453, (618) 457-5258; \$24.95 plus \$3 S/H.*

Trivia Quizzes, preconstructed data files for use with the Brainbuster Test Writer or Examiner programs. Four separate quizzes are available. *Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453, (618) 457-5258; 25 questions \$5.50, 50 questions \$10.95 plus \$3 S/H.*

Diskette File Protector, this copy-protection scheme changes the filename extension to protect files from being run or killed. Protected filenames must be unprotected prior to being run or executed. Programs allows for tagging of multiple filenames. Requires a CoCo 3 and one disk drive. *Datatech Micro Systems, 4612 Arden, Lansing, MI 48917; \$10 plus \$2.50 S/H.*

Mixed Blessings, a collection of 23 programs. Includes a random-maze generator, an address-storage/retrieval system, several games, utilities, and a two-player chess simulation. All programs compatible with the CoCo 2, most will run on a tape-based system. *John Friedrich, Grove City College, Box 1877, Grove City, PA 16127, (412) 458-3088 or (412) 224-4194; \$17.95, specify tape or disk.*

BED, binary editor for disk. Helps fix disk problems. It reads any sector and displays, edits, and writes it to disk. It also searches disks for bad sectors. *Soft & Friendly, 129 Prairie, Virdon, IL 62690, (217) 965-4199; \$13.95 plus \$2.95 S/H.*

CC3FAX, this program allows you to receive FAX transmissions. Requires a 512K CoCo 3, 40-track DSDD Drive 0 and a shortwave receiver capable of SSB (single-sideband) or CW (morse code) reception. It is now possible to see the entire 368K picture on a 256-by-225 screen as a 1/64 size image; resolution 1/8 horizontal by 1/8 vertical. Additional print drivers are being added to the program. *Robert Gault, 832 N. Renaud, Grosse Pointe Woods, MI 48236; \$29 plus min \$4 S/H.*

Smartwatch Drivers, these drivers are for the CoCo 3 only. They make the functions of the SmartWatch (sold by Tandy and other sources in the RAINBOW) available to the standard Tandy Disk BASIC 1.0 and 1.1 systems. The 12- or 24-hour format can be selected. Also included is a driver for Ultimterm modem-communications program. *Robert Gault, 832 N. Renaud, Grosse Pointe Woods, MI 48236; \$12 plus min \$4 S/H.*

CEBBS Online Programs, a collection of programs to provide operators of CEBBS with a variety of games and support files to enhance their BBS. Programs include craps, blackjack, hangman, a voting booth, drive configuration for support files, an editor for maintenance functions, an auto-alphabetizing BBS lister, a place for messages, and a personal-profile database program. *KB Enterprises, 435 Brightwaters Drive, Cocoa Beach, FL 32931, (407) 799-3253; \$15.95 plus \$3 S/H.*

First product received from this company

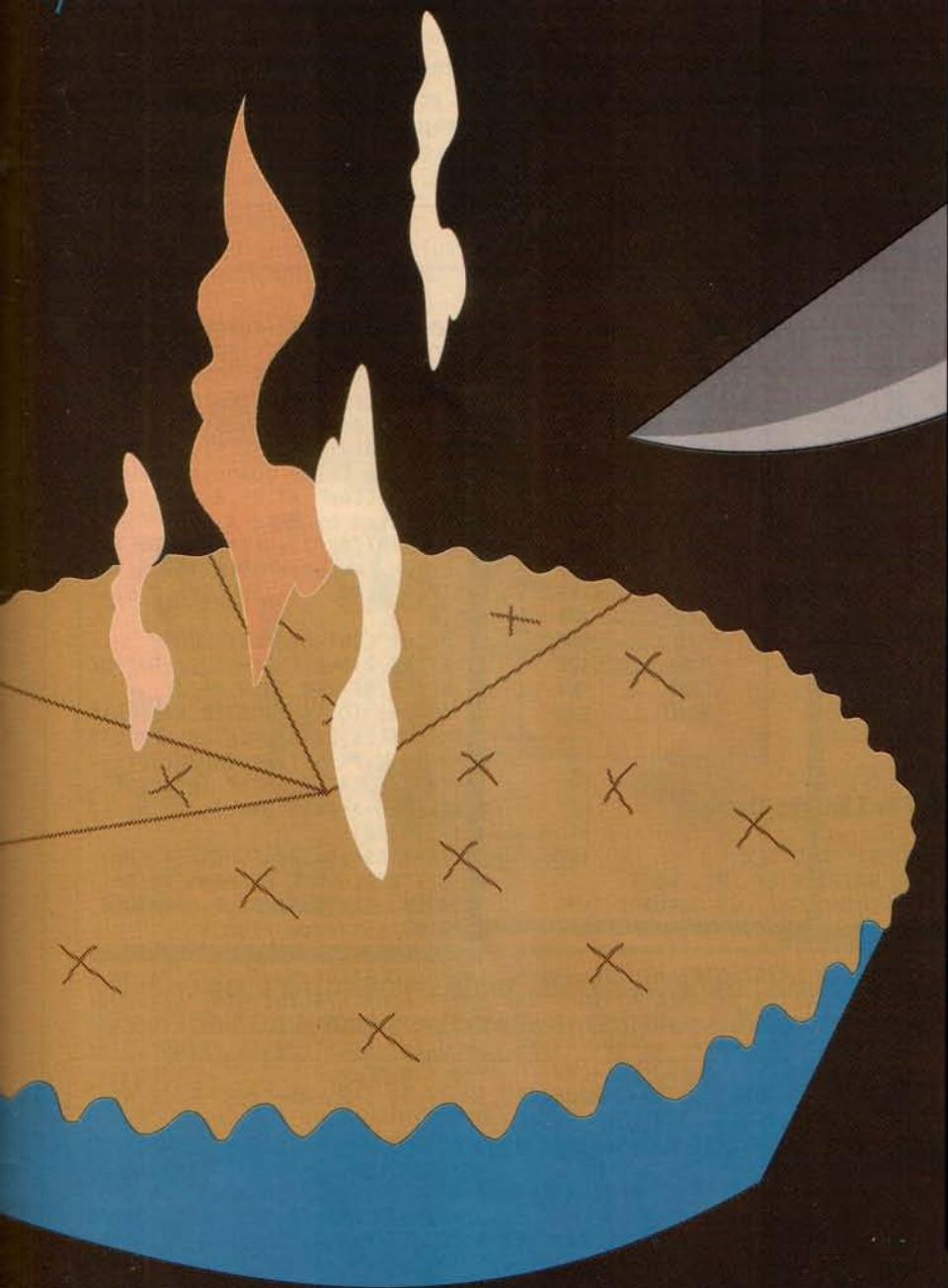
The Seal of Certification is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a Seal, the magazine certifies the program does exist — that we have examined it and have a sample copy — but this does not constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

Pie Plotter

*In search
of a better slice . . .*

by Eric A. Wolf



Pie Plotter allows Color Computer 3 users to draw multi-color pie graphs from raw data. The program runs with either an RGB or composite monitor and requires a disk drive for loading and saving graphs. The program uses the high-speed mode and the 320-by-192, 16-color high-resolution screen for graphics. You can enter up to 14 separate data samples and the program graphs them in their own colors (with labels and percentages) for visually pleasing graphics results. *Pie Plotter* makes the task of designing pie graphs easier for the beginner as well as the advanced user.

Operating Instructions

Enter the program from Listing 1 and save it to disk. Then enter RUN to start the program. The Settings control menu appears on the screen with blank graph data listed. This is where you conduct most of your work. The yellow text is the data and the green line at the bottom is your current title for the graph data. The gray text at the right of the screen has commands that alter or display this data. These selections are explained below.

Shadow Graph — Pressing S toggles this choice between Yes and No. If you choose Yes, the graph will have a gray shadow behind it. If you choose No, there will be no shadow.

Modify Entry — Pressing M allows you to change data in one of the 14 data slots in the yellow data column. Enter the number of the slot you want to modify (1-14) or enter 99 to exit this process. After entering the appropriate slot number, enter the modified data. Numbers 0-9999 are accepted. Next, enter the label that goes with this data. The new data is placed in the data column accordingly.

Eric Wolf is a sophomore at LaSalle High School. He has been writing computer software for several years now and is the author of *The Newspaper* desktop publishing system. He can be contacted at 1630 N. Johnson Street, South Bend, IN 46628.

Plot Chart—Press P to plot the entered data as a circular pie chart. The screen clears and the graph is drawn along with percentages, labels and the graph title. After the graph is drawn, press any key to return. *Pie Plotter* plots the graph according to the relation of a specific number to other numbers in the total data table. The sin and cos mathematical functions are used for line placement.

Input/Output—Pressing I takes you to the Input/Output control menu. From here you can save, load, clear and display your graphs, as well as perform the functions listed below. To activate a function, just press the number associated with it on the I/O control menu.

Clear—clears the graph currently in memory.

Load—allows you to load a previously saved graph from disk. Enter the filename or DIR for a disk directory. The graph is displayed. Press a key to continue.

Save—enables you to save a graph in memory to disk. Enter the filename you want the data saved with, or enter DIR for a disk directory. After the graph is saved, you are returned to the I/O menu.

Display—draws the currently defined chart. See Plot Chart for more information.

Demographics To Screen—prints the demographics of the data to the screen. This includes chart titles, percentages, labels and units for the data in memory. This function also displays the amount of data accounted for in the graph. Press any key to continue.

Demographics To Printer—identical to the Demographics To Screen option except the results are sent to the printer.

Exit—return to the Control Editor.

Clear Graph Data—Pressing C clears the current data. You are asked if this data is actually to be cleared. Enter Y to clear the data or N to abort the clearing process.

Degree of Rotation—This number signifies the degree at which the first line of the graph is to be drawn. Pressing D increases this number by two degrees. The degree of rotation is usually 0, but other values will tilt your graph for added effects.

Title—Pressing T allows you to enter a new title for your graph. Type the new title and press enter. A title can be only about 30 characters long. The title appears at the top of the screen when the chart is displayed.

Monitor Selection

Due to video hardware differences of CoCo 3s, you must tell the program what type of monitor you are using. To do this, modify Variable MN as indicated in Line 10.

If you are using an RGB monitor, leave the value at 0 (zero). If you are using a composite monitor, set the value to 1.

Sample Session

To begin, imagine you are writing a report on how people spend their weekends. You have surveyed several groups of various ages and have received 487 responses. Now you need a way to effectively communicate this information to readers. Use *Pie Plotter* to perform this task. You can easily plot a pie graph to better show this information.

Through the study you have determined that 120 people spend their weekends shopping. So, press M to modify a slot in your graph. Next, enter 1 to select the first blank in the graph. Enter 120 to indicate the data value for this slot. And enter SHOPPING, the label that goes with this slot.

In the survey you found 54 people like to travel on the weekend. Again, press M and enter 2 to alter the second data slot. Enter 54 to signify the number of people and then enter TRAVEL for the label.

You also found 87 people who go to the beach on the weekend. Press M and enter 3. Enter 87 for the number of people and AT BEACH for the label.

A majority of your survey, 98 people like to stay home all weekend and watch TV or work around the house. Press M and enter 4 for the fourth slot. Enter 98 for this group and label them STAYS HOME.

There is a group of people who work on the weekend. Press M and enter 5. Now enter the number 90 and label this group WORK.

To round out your survey, there are 38 people who don't fit into any specific category and need to be placed in a miscellaneous category. Press M and enter 6 for Slot 6. Now enter the number 38 and the label MISC.

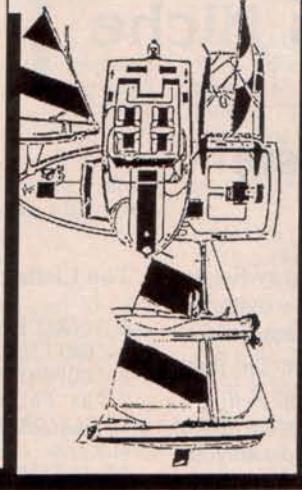
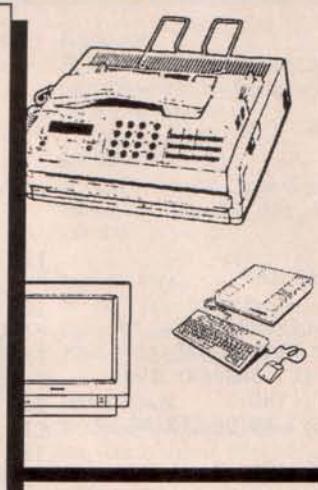
To title your graph, press T and enter WHAT PEOPLE DO ON A WEEKEND. Your graph is now complete. To view the graph, press P. Press any key to return. This should help you get started. Have fun and happy pie graphing. □

CoCo 3 Disk	
<pre> 8 18 AD-&HF09D:FORY-AD+256 TO AD+2 62:POKE Y,255:NEXTY:POKE Y,0:FOR Y=AD+216 TO AD+223:POKE Y,255:N EXT:Y=AD+216:POKE Y,0:POKE Y+2,0 :POKE Y+7,0:POKE Y+5,0:AD-0 20 ATTR0,0:WIDTH40:CLS1:ATTR6,0: PRINT" The Color Computer 3 Pie Chart Plotter":ATTR5,0:PRINTTAB(9); :"Written by Eric A. Wolf":ATT R4,0:PRINTTAB(3);:"For a 128k TAN DY Color Computer 3":ATTR5,0:PRI NTSTRING\$(40,"-");:LOCATE12,5:AT TR5,0,U 22 PRINT"CONTROL SETTINGS": 24 ATTR0,0:T=0:FORY=1TO14:T=T+D(Y):NEXTY:IF T=0 THEN T=.01 26 FORY=1 TO 14:LOCATE0,6+Y:PRIN TSTRING\$(26,32);:LOCATE3-LEN(STR \$(Y)),6+Y:PRINTY::LOCATE3,6+Y:PR INT")";:LOCATE4,6+Y:PRINTD(Y)::L OCATE10,6+Y:PRINTD\$(Y)::Z=INT((D (Y)/T)*100) 28 Z\$=STR\$(Z):Z\$=RIGHT\$(Z\$,LEN(Z \$)-1)+"%":LOCATE 25-LEN(Z\$),6+Y: PRINTZ\$::NEXTY:ATTR5,0:LOCATE26, 8:PRINT"(S)hadow Pie?": 30 LOCATE26,11:PRINT"(M)odify En try";:LOCATE26,13:PRINT"(P)lot C hart":LOCATE26,15:PRINT"(I)nput/ Output";:LOCATE26,17:PRINT"(C)le ar data":LOCATE26,19:PRINT"(D)e ree start"; 32 IF SH THEN A\$="YES" ELSE A\$="N O" 34 ATTR6,0:LOCATE30,9:PRINT"- "; A\$:LOCATE30,18:PRINTSTRING\$(8,32):LOCATE32,20:PRINTAD:ATTR5,0 36 B\$=STRING\$(40,32):ATTR6,0:LOC ATE0,21:PRINTB\$::LOCATE0,22:PRINT "(T)ITLE";:ATTR2,0:PRINTT\$:ATT </pre>	
The Listing: PIECHART	
<pre> 0-*PIE PLOTTER WRITTEN BY ERIC WOLF COPYRIGHT (C) JANUARY 1991 BY FALSET, INC. 1 **** 2 * PIE CHART DISPLAY UTILITY * 4 ** WRITTEN BY ERIC A. WOLF * 6 ** FOR A 128K TANDY COCO 3 * 8 **** 10 MN=0 '<--- 0-RGB & 1-CMP 12 IF MN=0 THEN RGB:MN\$="008092 5323634535402162207566356" ELSE CMP:MN\$="00131145072321543602173 416326332" 14 FORY=0 TO 15:PALETTE Y,VAL(MI D\$(MN\$,Y*2+1,2)):NEXTY 16 POKE65497,0:ATTR0,4:PCLEAR1:C LEAR3200:DIM D(15),D\$(15):GOSUB6 </pre>	

```

R5,0
38 LOCATE38,23:FL=0
40 A$=INKEY$:IFA$="S" THEN FL=1:
IF SH-1 THEN SH=0:GOTO32 ELSE SH
-1:GOTO32
42 IFA$="T" THEN LOCATE9,22:ATTR
6,0:PRINT STRING$(60,32)::LOCATE
9,22:LINEINPUT T$:T-LEN(T$):T$=L
EFT$(T$,28):IF T>28 THEN 20 ELSE
36
44 IF A$<>"M" THEN 50 ELSE LOCAT
E0,22:PRINTSTRING$(40,32)::LOCAT
E0,22:LINEINPUT"Modify what unit
(1-14/99 - exit) >";M$:M=VAL(M$)
:IF M=0 OR M>14 THEN LOCATE0,22
:PRINTSTRING$(64,32)::LOCATE0,23
:GOTO50
46 ATTR6,0:LOCATE0,22:PRINTSTRIN
G$(40,32)::LOCATE0,22:INPUT"Ente
r new unit VALUE ";D(M):IF D(M)>
9999 THEN 46
48 LOCATE0,22:PRINTSTRING$(40,32
)::LOCATE0,22:INPUT"Enter new un
it LABEL ";D$(M):IF LEN(D$(M))>1
1 THEN 48 ELSE 24
50 IF A$="D" THEN AD=AD+2:FL=2:I
F AD>359 THEN AD=0
52 IF A$="I" THEN 108
54 IF A$="C" THEN LOCATE0,22:PRI
NTSTRING$(40,32)::LOCATE0,22:INP
UT"Sure you want to clear this (
Y/N) ";A$:IF LEFT$(A$.1)="Y" THE
N GOSUB68:GOTO20 ELSE 32
56 IF A$="P" THEN C2=CO:GOSUB 78
:EXEC44539:HSCREEN0:CO=C2:GOT020
58 IF FL=1 THEN 20 ELSE IF FL=2
THEN 32 ELSE 40
60 GOTO 60
62 '
64 REM ** CLEAR DATA TABLES **
66 '
68 B$=STRING$(11,46):FORY=1TO14:
D$(Y)=B$=D(Y)=0:NEXT:D(15)=9999:
SH=1:SC=1:MC=14:CO=1:T$="NO TITL
E":AD=0:ST=1
70 RETURN
72 '
74 REM ** PLOT PIE CHART **
76 '
78 HSCREEN2:X1=77:Y1=100:RD=77:C
0=ST:R1=RD/2:R2=5:T=0:C=0:IF SH
THEN HCIRCLE(X1+R2-2,Y1+R2),RD,1
5:HPAINT(X1+4,Y1+4),15,15:C1=0
80 C-C+1:IF D(C)=9999 THEN 86 EL
SE T-T+D(C):GOT080
82 IF D(C) THEN C1=C1+1
84 GOT080
86 IF T=0 THEN T=.0001
88 TX=10-INT(C1/2)
90 C-C-1:AO=AD/3.6:FOR Y=1 TO C:
HCOLOR CO:HCIRCLE(X1,Y1),RD:IF F
IX((D(Y)/T)*100)-0 THEN 98 ELSE
AN-AO:A1=AO:GOSUB100:HLINE(X1,Y1
)-(X2,Y2),PSET
92 AN=100*(D(Y)/T)+AO:AO=AN:A2=A
N::GOSUB100:HLINE(X1,Y1)-(X2,Y2)
.PSET:AN=A1+(A2-A1)/2:RD=RD-R1:G
OSUB100:HPAINT(X2,Y2):RD=RD+R1
94 A$=STR$(FIX(D(Y)/T*100)):A$=R
IGHT$(A$,LEN(A$)-1):A$=STRING$(3
-LEN(A$)," ")+A$:A$=A$+"% @@ "+D
$(Y):HPRINT(19,TX),A$:TX=TX+1
96 CO=CO+1:IF CO-MC+1 THEN CO-ST
98 NEXTY:HCIRCLE(X1,Y1),RD,0:HCO
LOR15:A$=STRING$((40-LEN(T$))/2-
1.59)+" "+T$+" "+STRING$((40-LEN
(T$))/2-1.59):HPRINT(0,0),A$:RET
URN
100 A=AN/57.141*3.6:X2=X1+SIN(A)
*RD:Y2=Y1-COS(A)*RD:RETURN
102 '
104 REM ** INPUT/OUTPUT
106 '
108 HSCREEN0:CLS:ATTR6,0:PRINTTA
B(3):"PIE CHART INPUT/OUTPUT CON
TROL MENU":ATTR5,0,U:PRINTSTRING
$(40,32)::ATTR6,0:PRINT:PRINTTAB
(9)"Please select a choice":ATTR
5,0:PRINT:PRINTTAB(42)"1. Clear
the data in memory":PRINT
110 PRINTTAB(2)"2. Load in a cha
rt from disk":PRINT:PRINTTAB(2)"3.
Save a chart to disk":PRINT:P
RINTTAB(2)"4. Display the chart
in memory":PRINT:PRINTTAB(2)"5.
Print chart demographic (Screen)
":PRINT
112 PRINTTAB(2)"6. Print chart d
emographic (Printer)":PRINT:PRIN
TTAB(2)"7. Exit back to the Sett
ings Control"
114 ATTR6,0:LOCATE10,21:INPUT"Yo
ur Choice > ";CH:IF CH<1 OR CH>7
THEN 114
116 IF CH=1 THEN GOSUB68:GOT020

```

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```

118 IF CH=4 THEN C2=C0:GOSUB78:E
XEC44539:CO-C2:GOTO108
120 IF CH=5 THEN D=0:GOTO138
122 IF CH=6 THEN D=2:GOTO138
124 IF CH=7 THEN 20
126 IF CH=3 THEN 178
128 IF CH=2 THEN 196
130 STOP
132 '
134 REM ** PRINT DEMOGRAPHIC
136 '
138 CLS:IF D=2 THEN LOCATE0,12:
PRINT"Ready printer and press an
y key to begin":EXEC44539:POKE6
5496,0
140 V=0:CLS:PRINT#D," TITLE: ";T
$:PRINT#D:PRINT#D," PERCENT LA
BEL"+STRING$(11,32)+"UNITS":PRIN
T#D," :STRING$(35,"-"):FORY=1TO
14:IF D(Y)=0 THEN 148 ELSE PRINT
#D," :PRINT#D,USING("##.##");(
D(Y)/T*1000);:V=V+INT(D(Y)/T*100
0)/100:P$=" % - "
142 P$=P$+D$(Y)+STRING$(16-LEN(D
$(Y)),32)+"
144 P1$=STR$(D(Y)):P1$=RIGHT$(P1
$,LEN(P1$)-1):P$=P$+P1$+""
146 PRINT#D,P$
148 NEXTY
150 PRINT#D," :STRING$(35,"-"):
PRINT#D,USING("##.##");V::PRINT
#D," % accounted for in graph":P
RINT#D:PRINT#D
152 IF D=0 THEN EXEC44539
154 POKE65497,0:GOTO 108
156 '
158 REM ** INPUT A FILENAME
160 '
162 ATTR5,0:LOCATE0,3:PRINT"Ente
r the filename of the graph in w
hich you want to load or type DIR
and enter to view the disk dir
ectory of a drive or enter EXIT t
o exit back to the menu":ATTR6,0
164 LOCATE0,8:LINEINPUT"Filename
(or DIR)--> ";F$:IF F$<>"DIR" T
HEN RETURN
166 ATTR5,0:LOCATE0,9:LINEINPUT"
Directory of what drive (0-3) >
:D$:DR=VAL(D$)
168 IF DR<0 OR DR>3 THEN 166 ELS
E PRINT::ATTR6,0:POKE65496,0:DIR
DR:PRINT:PRINT"Free Gans- ";FRE
E(DR):EXEC44539:POKE65497,0
170 RETURN
172 '
174 REM ** SAVE A FILE
176 '
178 ATTR6,0:CLS:LOCATE3,1:PRINT"
-Save in a pie graph to disk -"
:GOSUB162
180 IF F$="EXIT" THEN 108
182 IF F$="DIR" THEN 178 ELSE AT
TR6,0:CLS:A$="Save the file "+F$:
LOCATE20-LEN(A$)/2,5:PRINTA$:LO
CATE0,10:ATTR5,0:PRINT"Press SPA
CEBAR to save the file or press a
ny other key to exit back to the
Input/Output Menu.."
184 A$=INKEY$:IFA$="" THEN 186
ELSE IFA$<>"" THEN 108 ELSE 204
202 A$=INKEY$:IFA$="" THEN 204
ELSE IFA$<>"" THEN 108 ELSE 202
204 ATTR6,0:LOCATE10,15:PRINT"Lo
ading Graph Now...":POKE65496,0:
OPEN"I",#1,F$
206 INPUT#1,SC:INPUT#1,ST:INPUT#
1,MC:INPUT#1,SH:INPUT#1,DG:INPUT
#1,AD:INPUT#1,T$:FORY=1TO15:INPU
T#1,D(Y):INPUT#1,D$(Y):NEXTY:CL
OSE#1:POKE65497,0
208 C2=C0:GOSUB78:EXEC44539:HSCR
EEN0:C2=C0:GOTO108

```

Disk Utility

32K Disk

Novices Niche

Directory Lister by Mike Moore

Dirlst sends the directory listing of a disk to the printer. The output is neatly listed in a two-column format. The advantage is that you can then cut out the listing and keep it in the jacket of the disk. This helps when searching for files stored on your disks.

When the program is run, you are asked for the disk name. This information is printed at the top of the listing to identify the disk being used. The number of free granules remaining on the disk is given next, followed by a listing of all the files on the disk in a format similar to DIR.

The only preparations for this utility are to make sure there is a disk in Drive 0 and the printer is online.

The Listing: DIRLIST

```

0 ' DIRECTORY LISTER
1 'WRITTEN BY MIKE MOORE
2 'COPYRIGHT (C) JANUARY 1991
3 'BY FALSOFT, INC.
10 CLEAR800 'SET ASIDE STRING SP
ACE
20 INPUT"DISK NAME";N$
30 DIMR$(1):R$(0)=" " :R$(1)=CHR
$(13) ' CARRIAGE RETURN
40 N=2 ' DEVICE IS THE PRINTER
50 PRINT#N,N$+" FREE";FREE(0)
'PRINT THE TITLE
60 PRINT#N," " 'BLANK LINE
70 DSKI$0,17,2,C$,A$:C$=LEFT$(C$
,68) 'GET GRANULE POSITIONS
80 FOR S=3 TO 11:DSKI$0,17,S,A$,
B$ 'READ DIRECTORY
90 A$=A$+LEFT$(B$,127) :L=255 '
COLLECT NAMES TOGETHER
100 M$=LEFT$(A$,11)+"      " 'FIL
E NAME

```

```

110 IF ASC(M$)=255 THEN PRINT#N,
" " :END 'END OF NAMES
120 IF ASC(M$)=0 THEN 210 'THIS
FILE WAS KILLED
130 A=(MID$(A$,13,1)=CHR$(255))
'FILE TYPE
140 MID$(M$,13)=CHR$(66+A) '(A)$
CII OR (B)INARY
150 G=1+ASC(MID$(A$,14)) :R=0 '
FIND FIRST GRANULE
160 R=R+1:G=1+ASC(MID$(C$,G)) '
COUNT NEXT GRANULE
170 IF G<69 GOTO 160 'MORE GRANU
LES TO GET
180 B$=STR$(R) : MID$(M$,14,LEN(
B$))-B$ 'PUT IN # OF GRANULES
190 M$=LEFT$(M$,8)+" "+RIGHT$(M$,
,8) 'SEPERATE NAME & EXTENSION
200 PRINT#N,M$+R$(P); :P=1-P 'P
RINT
210 L=L-32 : IF L>0 THEN A$=RIGH
T$(A$,L) : GOTO 100 'DROP A FILE
220 NEXT S 'GET NEXT SECTOR

```

Intercom

An important link in the CoCo community is its ability to communicate with fellow users. If questions arise, a fresh source of information can be invaluable. We here at THE RAINBOW have decided to create "Intercom," an information exchange point for Pen Pals, CoCo Clubs and BBSs.

If you would like a Pen Pal or are running a CoCo Club or BBS, send us a letter including the information listed here to: The Rainbow Intercom, P.O. Box 385, Prospect, KY 40059.

Only those parties who have signed our non-piracy "agreement form" appear in listings of Intercom. Also, please notify us if you want to add or delete any names on this list.



PEN PALS

I'm 16 years old. I bought a CoCo 3 last June and I've had a CoCo 2 since 1985. I live in Missoula, Montana and feel quite alone with my CoCo in this area. I've found no support anywhere nearby. I have not even met anyone who has a CoCo! I have lots of technical questions. Will someone continually write and expect letters from me. I need a Pen Pal who will help me. Also, I will help you, so please write.

Michael J. Miller
RR2 Moccasin Meadows
Missoula, MT 59802

I'm interested in finding some local support for our CoCo. I haven't been able to locate a CoCo club in the Indianapolis area. If you have an existing club in the area or might like to start a new one please contact me at the address below.

Ted Mathues
502 Shelby St.
Shelbyville, IN 46176

I'm trying to start a new CoCo club for the Houston, Texas area. If you would like to join or have some helpful advice please write.

Art Volz
16218 Brinkwood Drive
Houston, TX 77090

CoCo CLUBS

ARIZONA

Tucson Color Computer Club, Bruce Smith, 3030 Mustang Drive, Tucson, 85708, (602) 747-7859

CALIFORNIA

Citrus Color Computer Club, Orville Beaver, P.O. Box 6991, San Bernardino, 92412-6991, (714) 685-6334

The Sacramento CoCo Club, William W. Drennon, 2444 Wurth CT., Sacramento, 95825, (916) 486-9665, BBS (916) 486-1594

COLORADO

Colorado Springs Color Computer Club, Bud Ward,

1118 Claiborne Road, Colorado Springs, 80906-5513, (719) 392-8268

CONNECTICUT

South Eastern Connecticut Color Computer Users Group, Larry Donovan, 25 Stony Brook Road, Stonington, 06378, (203) 535-4211

FLORIDA

Cross-Country Color Computer Club, Tom Tittle, 860 Gardenia Drive, Royal Palm Beach, 33411, (407) 798-3726

GEORGIA

Macon-Warner Robins Color Computer Users Group, Francis G. Swygert, 904 2nd Avenue, Robins AFB, 31098, (912) 328-7859

IDAHO

Snake River Color Computer Club, Emil Franklin, 1750 Carmel Drive, Idaho Falls, 83403, (208) 522-0220

ILLINOIS

CoCo Users Group, c/o Greg Adams, 224 Park Drive, Sterling, 61081-3033, (815) 626-4962

KANSAS

The Kansas City Color Computer Users Group, Gay Crawford, 1601 Kiowa Drive, Olathe, 66062, (913) 764-9413

KENTUCKY

Hardin County Color Computer Club, Paul Urbahns, 2887 Republic Ave., Radcliff, 40160, (502) 351-4757

LOUISIANA

The CoCo Sig, Christopher Mayeux, 20 Gibbs Drive, Chalmette, 70043, (504) 277-6880, Modem (504) 277-5135

MICHIGAN

Color Computer Owners Group, Bernard A. Patton, 388 Emmons Blvd., Wyandotte, 48192, (313) 283-2474

MISSISSIPPI

Central Mississippi Color Computer Society, Boisy G. Pitre, 6011 I-55 North, Jackson, 39213, (601) 956-9377

MISSOURI

CoCoNuts User Group, Clyde Lloyd, 2116 N. Columbia, Springfield, 65803, (417) 866-8738

NEW YORK

Twin Tiers CoCo Club, William Cecchini, 319 Irvine Pl., Elmira, 14901, (607) 734-0065

NORTH CAROLINA

Raleigh CoCo Club, P.O. Box 10632, Raleigh, 27605, (919) 878-3865

The Tandy Color Computer Users of Charlotte, Eric Stringer, 1022 Noles Dr., Mt. Holly, 28120

OHIO

The Columbus and Central Ohio Color Computer Club, Richard Heber, 546 Woodside Drive S.W., Pataskala, 43062, (614) 927-3357

Dayton Area Color Computer Users Group, John Teague, 308 Orangewood Drive, Kettering, 45429, (513) 434-9168

The Greater Toledo Color Computer Club, Bill Espen, 1319 North St., Bowling Green, 43402, (419) 471-9444

PENNSYLVANIA

Johnstown Area Color Computer Users Group, Albert Baldish, 111 C St. Apt #1, Johnstown, 15906, (814) 535-1497

SOUTH DAKOTA

Empire Area Color Computer Users Group of South Dakota, Carl Holt, P.O. Box 395, Brandon, 57005, (605) 582-3862

AUSTRALIA

Australian National OS-9 Users Group, Gordon Bentzen, C-8 Odin Street, Sunnybank, Queensland, 4109, (07) 345-5141

Brisbane Southwest Colour Computer Users Group, Bob Devries, 21 Virgo St., Inala, Queensland, 4077, (61)-7-3727816

CANADA

Club Ordinateur Metro Inc., William Manning, 3020 D'Angouleme, Tracy, Quebec, J3R 3B3, (514) 742-3692

Calgary Colour Computer Club, Gerry McCleary, P.O. Box 22, Station M, Calgary, T1Y 5C4

Le Club D'Ordinateur Couleur du Quebec Inc., 7110 8 e. Ave, St-Michel, Montreal, Quebec, H2A 3C4, (514) 729-8467

Moncton-Dieppe-Riverview CoCo Club, Philippe Lantin, 77 Ninth St., Moncton, New Brunswick, E1E 3E5, (506) 382-7706

GERMANY

OS-9 Users Group in Europe, Burghard Kinzel, Leipziger Ring 22A, D-5042 ERFTSTADT

PUERTO RICO

Puerto Rico Color Computer Club, Luis R. Martinez, P.O. Box 2072, Guaynabo, 00657-7004, (809) 799-8217 or (809) 728-2314



BULLETIN BOARD SYSTEMS



State/City	BBS Name	Access Number	Parameters (Baud rate-Parity-Word Bits-Stop Bits)	SysOp
Arkansas Jonesboro	The 8-Bit Wonderland	(501)931-9528	300/1200/2400-N-8-1	Mike Smith
Sheridan	The Grant County BBS	(501)942-4047	300/1200/2400-N-8-1	Eddie Gilmore
California Hollywood	Zog's Cavern BBS	(213)461-7948	300/1200/2400-N-8-1	Alan Sheltra
Laguna Hills	Rainbow Connection Info Service	(714)831-6530	300/1200/2400-N-8-1	Eric Levinson
Marysville	09-Online BBS	(916)742-6809	300/1200-N-8-1	Jim Vestal
Colorado Colorado Springs	The Time Safari	(719)635-7228	300/1200-N-8-1	David Vallier
Florida Cocoa Beach	KB Enterprises' CEBBS ¹	(407)799-3282	300/1200-N-8-1	Kevin Berner
Hawaii Ft. Shafter	CoCo'Nuts BBS Service ²	(808)845-7054	300/1200/2400-N-8-1	Tommie Taylor
Illinois Carpentersville	The Pinball Haven BBS	(708)428-8445	300/1200/2400-N-8-1	Jeffrey R. Chapin
La Grange Park	S & V BBS	(708)352-0948	300/1200/2400-N-8-1	Paul Jerkatis
Kansas Beloit	Kansas Konnektion BBS ³	(913)738-5613	300/1200/2400-N-8-1	Gary N. McCarty
Louisiana Harvey	The Node 3	(504)347-4320	300/2400-N-8-1	Gene Clifton
Massachusetts Worcester	Gosub BBS	(508)756-1442	300/1200/2400-N-8-1	Richard Bostock
Michigan Taylor	J & L's CoCo Corner	(313)292-4713	300/1200/2400-N-8-1	Jim Snider
New Hampshire Allenstown	The CoCoBean BBS	(603)485-8682	300/1200/2400-N-8-1	David Bean
New York Wappingers Falls	The Dutchess CoCo	(914)838-1261	300/1200/2400-N-8-1	Chris Serino
North Carolina Concord	The Stargate BBS	(704)788-7867	300/1200/2400-N-8-1	Jim Brock
Oklahoma Tecumseh	Pat BBS ⁴	(405)598-5082	300-N-8-1	Pat Aldridge
Pennsylvania Conshohocken	Charlie's Help Line	(215)825-3226	300/1200-N-8-1 or N-7-1	Charles DiMartino
Johnstown	CoCo Electronic BBS ⁵	(814)535-1497	300/1200/2400-N-8-1	Albert Baldish
Rhode Island Central Falls	The Weather Connection II BBS	(401) 728-8709	300/1200/2400-N-8-1	Eric Chew
Tennessee South Pittsburg	Base-Net BBS	(615)837-8352	300/1200/2400-N-8-1	Howard Bacon
Virginia Falls Mills	Clem's Corner BBS ⁶	(703)322-4053	300/1200-N-8-1	Richard Douglas Bailey
Richmond	Tree House BBS	(804)744-9260	300/1200/2400-N-8-1	Doug James
Wisconsin Marinette	Phoenix Interstate Data Systems ⁷	(715)732-1036	300/1200/2400/9600-N-8-1	Joe Boburka
Canada Lunenburg, N.S.	Color Nova BBS	(902)634-3095	300/1200/2400-N-8-1	John D. Cleveland

Notes:

¹KB Enterprises' CEBBS is up 5 p.m. to 9 a.m. seven days a week (EST).

²CoCo'Nuts BBS Service is a relocation of CoCo'Nuts BBS of Fayetteville, North Carolina.

³Kansas Konnektion BBS is up from 10 p.m. to 7 a.m.

⁴Pat BBS is up 5 p.m. to 9 p.m. weekdays and 10 a.m. to 10 p.m. weekends. This new BBS is counting on you for uploads.

⁵CoCo Electronic BBS is up 8 p.m. to 6 a.m. seven days a week.

⁶Clem's Corner is up from 6 p.m. to 11 p.m. seven days a week.

⁷Phoenix Interstate Data Systems has a .75/hr charge for premium services, paid in advance.

NEW FOR '91

SUNDog SYSTEMS

The Quest for THEELDA



Better men than you have failed the quest, but the hand of the good princess Thelda is too much to resist! Stolen by the evil necromancer Divinax, she has been secreted far from prying eyes and it is now up to you to regain the pieces of the mystical Life Force and save the fair lady. The Quest for Thelda is an outstanding arcade program that combines action and adventure to bring you an incredible video game playing experience. Travel throughout over 500 different screens searching for magical objects and spells, fighting horrible creatures, and gathering the various parts of the Life Force guarded by ever-increasing terrors. You'll enjoy the highest quality 320x200 resolution 16 color graphics and digital sound effects that you've come to expect from Sundog Systems. The game play is fast and furious, and only you can rescue the princess and complete the LEGEND OF THEELDA! Req. 128K CoCo 3, disk drive, and joystick (2-button joystick supported).

\$34.95

Hint book now available for Thelda! Contains clues, maps, and even a BASIC program to modify your own characters! **\$4.95**

Zenix



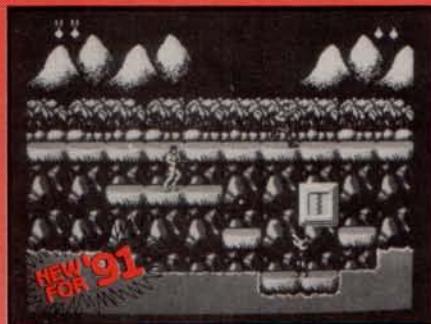
NEW FOR '91

SCORE: 888884 FUEL: —

You have been chosen to pilot the spacecraft wielding the plutonium plasma laser against the nefarious insectoids, the Zenians. These bugs have been ripping off the space trade lines for years; now they're about to find a victim who can fight back! Beat back the swarm of pests to their home planet Zenix, and use the laser to end the menace once and for all. Zenix is a lightning fast arcade game for the 128K CoCo 3. The 320x225 16 color graphics are amazing, as are the digital background music score and effects, all on a 128K computer! The fast action and game play will astound you in this GALAGA of extermination. Plug in your joystick and strap in for the ride of your life! Call to order a demo disk to see the action before you buy! Req. 128K CoCo 3, disk drive, and joystick.

\$29.95

★ THE CONTRAS ★



NEW FOR '91

In the year 2671, a mysterious object landed on Earth, heralding the alien invasion of the Red Falcon. Only two courageous soldiers have a hope of stemming this alien infestation. Armed with your military training and the latest weapon technology, you and a friend must fight back the horde. Sundog Systems presents our second 512K game, **The Contras**. You'll see why we decided to use 512K on this project! Amazing graphics with 320x225 resolution, 16 color full screen animation and horizontal smooth scrolling! Background digital sound effects and real-time music! One or two player action AT THE SAME TIME! You'll agree that this is one of the best arcade games yet for your 512K CoCo 3. Needless to say, playing hero won't be easy; playing The Contras will be!

Req. 512K CoCo 3, disk drive, and 2-button joystick.

\$34.95

Crystal City



The superior technology of the evil Overlords has enslaved yet another innocent planet; however, this one contains the Crystal City, bastion of democracy and independence. Earth has had enough! Break through level upon level of their virtually invulnerable defenses; defeat the end guardians, and make your way ever closer to freeing the slaves of the Crystal City! This amazing arcade game is an achievement in its own right. Full 128K/512K utilization! Super fast horizontal hardware scrolling on the 128K computer! Wild digital sound effects and background music score 30 minutes, or over 30 megabytes, no-repeat 320x200 resolution, 16 color graphics! This game has it all; order a demo disk to see it first! Can you save the Crystal City from unbeatable foes? Req. 128K CoCo 3, disk drive, and joystick.

\$34.95

Sinistaar KYUUM-SAI TO BE NINJA



You've raved about this 512K arcade game! The graphics and animation are amazing! You've got to hear the digital sounds! 512K (three disks) packed with excitement. 512K CoCo 3 only. \$34.95



This martial arts arcade game remains a CoCo 3 phenomenon. One of our best sellers to date! Play the incredible combat experience that you've been missing, and call for the availability of the OS-9 version. 128K CoCo 3 action. \$29.95.

SoundTrax



This 128K/512K sound sequencing system has become an immensely popular program. Create musical scores using polyphonic digitized sounds and a user-friendly point and click editor. Call to order the SoundTrax demo program, and get 10% off your purchase with receipt. \$34.95

Now Available: SoundTrax instrument sample disks! Guitars, strings, woodwinds, and just plain weird instruments for your composing pleasure. Completely compatible with the SoundTrax system. 3 floppy (2 sides) disks full of sounds. \$12.95 each or \$29.95 for all three.



ALSO AVAILABLE:

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CoCo 1 - 3 \$29.95 ea.

Kung-Fu Dude
CoCo 1 - 3 \$24.95

Hall of the King Trilogy
CoCo 1 - 3 \$74.95

White Fire of Eternity
CoCo 1 - 3 \$19.95

Dragon Blade
CoCo 1 - 3 \$19.95

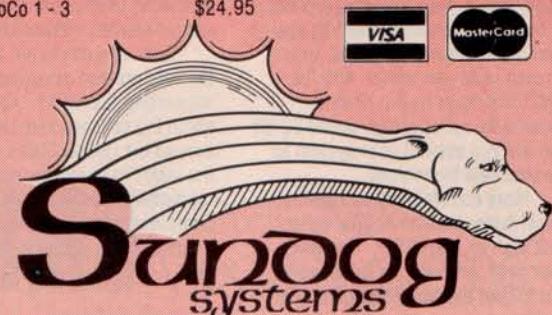
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The Color Computer™ era began ten years ago with an affordable upgradeable computer with great sound and graphics. The MM/1™ continues that tradition with powerful graphics, crystal clear sound, fantastic multitasking and familiar CoCo-style windows. And it goes far beyond competing computers with unprecedented power, software, and community support.

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More colorful than competing Macs, faster than an Amiga, better built than an Atari ST™. The MM/1 is your next computer — designed by you to lead the next color computer revolution.

Support.

We're pouring our energy into bringing the MM/1 the best of the MS-DOS™ and UNIX software catalogs. Interactive Media Systems, Inc. is launching the MM/1 into the mainstream, so you never need to complain about a lack of popular software again.

Our active developers program (the IMS Developers Association, or IDEA) has been secretly working for months on applications exclusive to the MM/1. These graphics editors, sound sampling programs, and animation utilities bring you unprecedented software power.

Give us a call to get a listing of all the vendors and developers supporting the MM/1. Ask us, too, about the colleges and universities around the United States already using the MM/1 in computer science and multimedia labs, pushing back computing frontiers with the same computer that is now available to you.

Smart.

If you're thinking of buying an IBM™ PC, Amiga, or Atari ST, think again. Much of your CoCo hardware is useless on these computers. All of your experience is also useless — unless you acquire an MM/1.

The MM/1 uses your RGB-A monitor, drives, joysticks, and lots of other hardware you already own. The MM/1 is easy to use with OS-9/68000™, windows, user guides, and more.

Personal Computing recently reported that about one of every four MS-DOS users will abandon it in the next two years in favor of UNIX-style computing. Why? Because they want multitasking windows. The MM/1 has multitasking windows and goes beyond most UNIX computers with its graphics, sound, and ease of use.

And smart computer purchasers want multimedia. *Byte Magazine*, *Amiga magazines*, *Computer Shopper* — even Radio Shack™ sales circulars — tout multimedia and multitasking as the way of the future. Can you find a multitasking, multimedia PC or Mac for less than \$2000? Unlikely.

But you can do it all on the MM/1.

Free.

For no extra charge, the MM/1 includes software worth over one thousand dollars. OS-9/68000, C compiler, Basic, IBM PC File Manager, tape backup support, a graphics editor, and more. Right out of the box. And enjoy a built-in software library that will give you plenty of power for years to come.

Customer satisfaction is built into the MM/1, too. Call for details on how to get your money back if not satisfied. And service? If ever you run into a problem, get in touch with us by phone, on information services, and on our exclusive customer BBS.

A quality staff backs up the MM/1. The IMS team includes top people from international computer firms as well as folks rooted in the CoCo world, and each person is committed to you.

Compare.

The MM/1 costs far less than comparably equipped PC compatibles, Amigas, and Atari STs. When you shop for a new computer, use this checklist for comparison.



For \$779,

you get an MM/1 with...

- slimline case with 200 Watt power supply
- a full one Megabyte of memory!
- a high-density floppy drive (1.4 Megabyte capacity)
- graphics resolution up to 720 x 540
- up to 256 colors from a palette of 16 million colors
- a true multitasking operating system — OS-9/68000
- windows, applications, utilities — \$300 value!
- 2 serial ports, for printers, mice, terminals ...
- MIDI-capable for the music hobbyist or professional
- PC keyboard port for XT style detachable keyboard
- Uses CM-8™ or similar monitor
- 15 MHz CPU — runs circles around the Amiga!
- built-in graphics coprocessor
- expandable with optional 32-bit high-speed bus

In other words, if you buy any other computer, you will probably get shortchanged.

Systems.

- | | | |
|-------------|---|----------------|
| MM/1 | Kit (1 Meg single board PCB, with software) 2 serial ports, PC keyboard port, RGB-A port, operating system, applications, instructions | \$659. |
| MM/1 | Personal (above with case, floppy drive, ready to go) | \$779. |
| MM/1 | Pro (Personal system, plus keyboard) | \$859. |
| MM/1 | Pro Station (Pro with RGB-A monitor) | \$1149. |
| MM/1 | Extended (super-enhanced with all software, plus extra serial ports, two parallel ports, stereo sound port, realtime clock, support for mice, joystick; call for details) | \$1125. |

Extras.

- | | |
|---|---------------|
| Other hot items from IMS are also available. Just call our toll free number to order what you like. | |
| MM/1 T-Shirt ("The Revolution Starts With Me") | \$8.95 |
| MM/1 video (interviews, demos) | \$8.95 |
| <i>The Insider</i> newsletter | \$9.95 |
- NC residents add appropriate sales tax. Some items require a small postage charge. Call for details.

Giveaway.

Thousands of people are already lining up to buy the MM/1. But if you'd like an MM/1 of your own, free, read this.

If you come to the Atlanta COCOFEST at the Atlanta Lakewood Holiday Inn, Oct. 6-7, Kenneth-Leigh Enterprises and Interactive Media Systems, Inc. will be there in full force, showing off the MM/1, its networking and graphics, its advanced windowing, and digital sound.

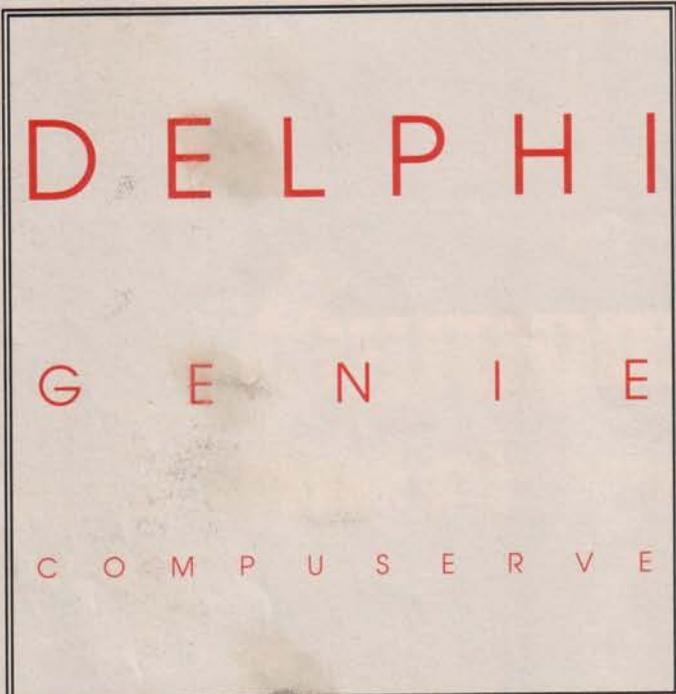
And one lucky attendant will win an MM/1. Free. Call COCOPRO! at 313/481-3283 for information on the Atlanta COCOFEST.

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On Display

We recently received the photo (below) of "Over the Rainbow" by Larry Elliot. Larry discovered THE RAINBOW after completing his work of art, and he decided to share his work with us. While the black and white photo (courtesy of Campanile Galleries Inc., Chicago) does little justice to the rainbow depicted in the original 20"-by-24" oil work, we wanted to pass it along.



language have always been, and must always be, a part of THE RAINBOW. They represent new directions toward which the CoCo and I can grow. Am I a minority of one? I think not. I hope not.

By the way, as I re-read six years of THE RAINBOW searching for answers to my dumb questions about OS-9, I see that the overall balance between "gibberish" and "BASICS" has not changed significantly. Yes, THE RAINBOW has shrunk in stature and I hate that. But it's no more (or less) an OS-9 or machine-language magazine than it was when I first discovered it.

Mr. Price, instead of thumbing through THE RAINBOW in your bookstore looking for "good usable material," try taking it home and reading it. You might accidentally learn something.

John B. Eads
Sarasota, Florida

Keeping the Beats

Editor:

I am a Music Education major at University of Wisconsin-Green Bay and find my collection of music (all formats) more difficult to search through for a particular work or artist.

What type of program would make this search faster? For example, type in Bach and get a list of his works or type in Kyrie for a list of various works by that title. Also, where could I purchase such a program?

Jeffrey Hess

1305 Lawe Street Lower
Green Bay, WI 54301

You could purchase a generic database and create your own indexed reference. Also, see "Music Catalog" (November 1990, Page 56).

DTP in ROM?

Editor:

My son gave me a 64K CoCo, one drive, a DMP-106 and a CCR-81 recorder. After much correspondence with Tandy, we were able to secure the Color Scripsit II cartridge. We are wondering now if there is a cartridge similar to the Color Scripsit II that could be used with this keyboard to make large letters for banners and perform Home Publishing duties as well.

When my son had this unit, he received THE RAINBOW and we have copies going several years back. If you can be of any help to us, we would appreciate it.

By the way, what is a Color Computer 3 worth and are they available for purchase?

Lorin Giegerich

P.O. Box 135

Prairie du Sac, WI 53578

You can purchase a CoCo 3 from Radio Shack or Computer Plus. The price varies, so you'll have to check the ads. We know of no cartridges with desktop publishing capabilities. After you pick up a CoCo 3, though, check the ads in THE RAINBOW for disk-based software.

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type RAI to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type LET to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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illustrated instructions, Includes 512K
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512k board w/software \$79.95
000k board w/software \$29.95

Quest for Thelda

You must rescue the princess Thelda in
this outstanding arcade style program.
500+ screens! Digital sound effects!
For 128k CoCo 3, joystk & disk ... \$34.95

The Contras

Amazing new 512K, 1 or 2 player action,
digital sound effects & real time music.
512K CoCo 3, 2B joystk & disk \$34.95

Crystal City

You must free the slaves of the Crystal
City in this fast action, arcade style game.
128K CoCo 3, joystk & disk \$34.95

ZENIX

An extremely Fast & Exciting arcade style
game with 32 levels of play! Blast through
insectoids & destroy their planet ZENIX!
For 128k CoCo 3, joystk & disk ... \$29.95

Those Darn Marbles

This incredible 3D marble game features
extra smooth screen scrolling, great sound
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Bowl Me Over

Excellent bowling fun for all! ... \$19.95



Suprfile III

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Module Buster

by Jamie L. Cho

Bust is an OS-9 utility that breaks down files of merged modules. Just enter *bust("pathname","directory")*. If you don't specify the directory, *Bust* uses the current data directory. The modules are transferred one by one from the specified file to separate files.

Bust assumes that *rename*, *attr* and *rnb* are available for its use. Load these before using *Bust*. Be careful which modules you breakdown. For example, you cannot bust the *shell* file that comes with OS-9 since it contains a program named *shell*. To avoid this problem, rename *shell* first. Also make sure you do not breakdown a file that contains modules already present in the directory being used. This results in an error.

The Listing: Bust.b09

```

PROCEDURE Bust
 0000  (* Module Buster *)
 0013  (* Written by Jamie L. Cho *)
 0030  (* Copyright (c) January 1991 *)
 0050  (* By Falsoft, Inc. *)
 0066
 0067  DIM ModSize,NameOffset,Count,InPath,OutPath:INT
EGER
 007E  DIM ModuleName,Title:STRING
 0089  DIM Char,ErrorNum,ByteVal,Number:BYTE
 009C  DIM Test:BOOLEAN
 00A3
 00A4  PARAM Filename:STRING[60]
 00B0  PARAM Directory:STRING[60]
 00BC
 00BD  ON ERROR GOTO 100
 00C3
 00C4  IF Filename=? THEN
 00D1    PRINT "Bust ("; CHR$(34); "pathname";
CHR$(34);":";
 00F3    PRINT CHR$(34); "directory"; CHR$(34); ")"
 010C    PRINT "Function: Breaks down a merged mod
ule."
 0137    PRINT "Requires Runb, syscall, attr and
rename"
 0162    END
 0164  ENDIF
 0166
 0167  ModuleName=Directory+{/scratch}
 017A 1  OPEN #InPath,Filename:READ
 0189  Number=1
 0190 10  Title=""
 019A  Test=FALSE
 01A0  Count=0
 01A7  CREATE #OutPath,ModuleName
 01B1 20  GET #InPath,Char
 01BE  PUT #OutPath,Char
 01C8
 01C9  IF Count=2 THEN
 01D5    ByteVal=Char
 01DD  ENDIF
 01DF
 01E0  IF Count=3 THEN
 01EC    ModSize=ByteVal*256+Char
 01FC  ENDIF
 01FE
 01FF  IF Count=4 THEN
 020B    NameOffset=Char
 0213  ENDIF
 0215
 0216  IF Count=5 THEN
 0222    NameOffset=NameOffset*256+Char
 0232  ENDIF
 0234
 0235  IF Count>3 THEN
 0241    IF Count+1=ModSize THEN
 0251      CLOSE #OutPath
 0257      Number=Number+1
 0262      PRINT Title,
 0268      SHELL "attr "+ModuleName+" e pe"
 027D      SHELL "rename "+ModuleName+" "+RIGHT$(Title,
LEN>Title)-1)
 029C
 029D  IF EOF(#InPath) THEN
 02A7    CLOSE #InPath
 02AD    END
 02AF  ENDIF
 02B1
 02B2  GOTO 10
 02B6  ENDIF
 02B8  ENDIF
 02BA
 02BB  IF Count>NameOffset AND Test=FALSE THEN
 02CE  IF Char>127 THEN
 02DA    Test=TRUE
 02E0    Char=LAND(Char,127)
 02EB  ENDIF
 02ED
 02EE  Title=Title+CHR$(Char)
 02FB  ENDIF
 02FD
 02FE  Count=Count+1
 0309  GOTO 20
 030D  END
 030F
 0310 100  ErrorNum=ERR
 0319
 031A  IF ErrorNum=56 THEN
 0326    ModuleName="scratch"
 0334    GOTO 1
 0338  ENDIF
 033A
 033B  PRINT "ERROR #"; ErrorNum
 034A  END

```

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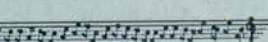
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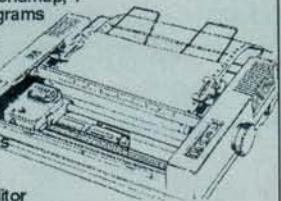
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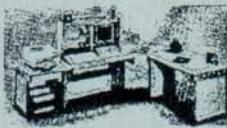


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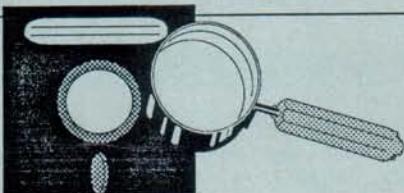
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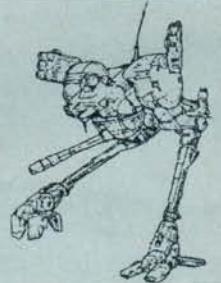
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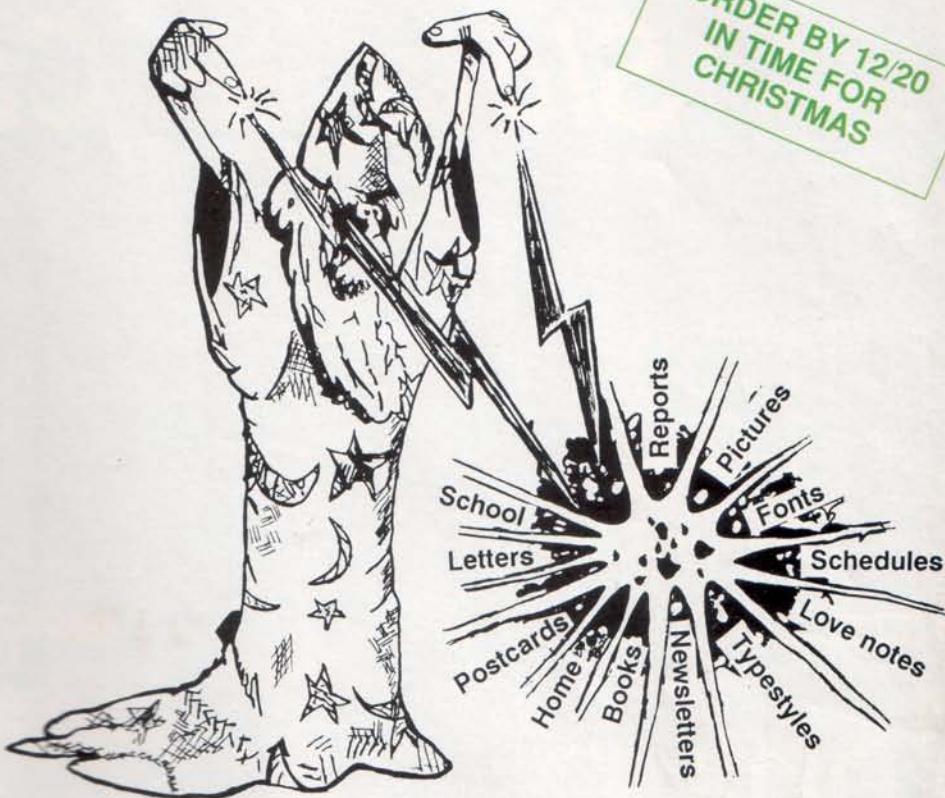
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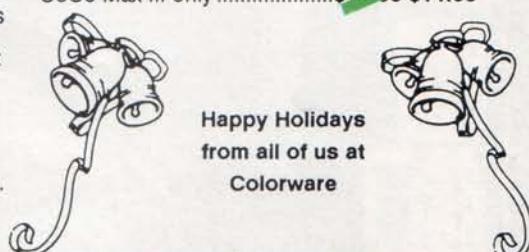
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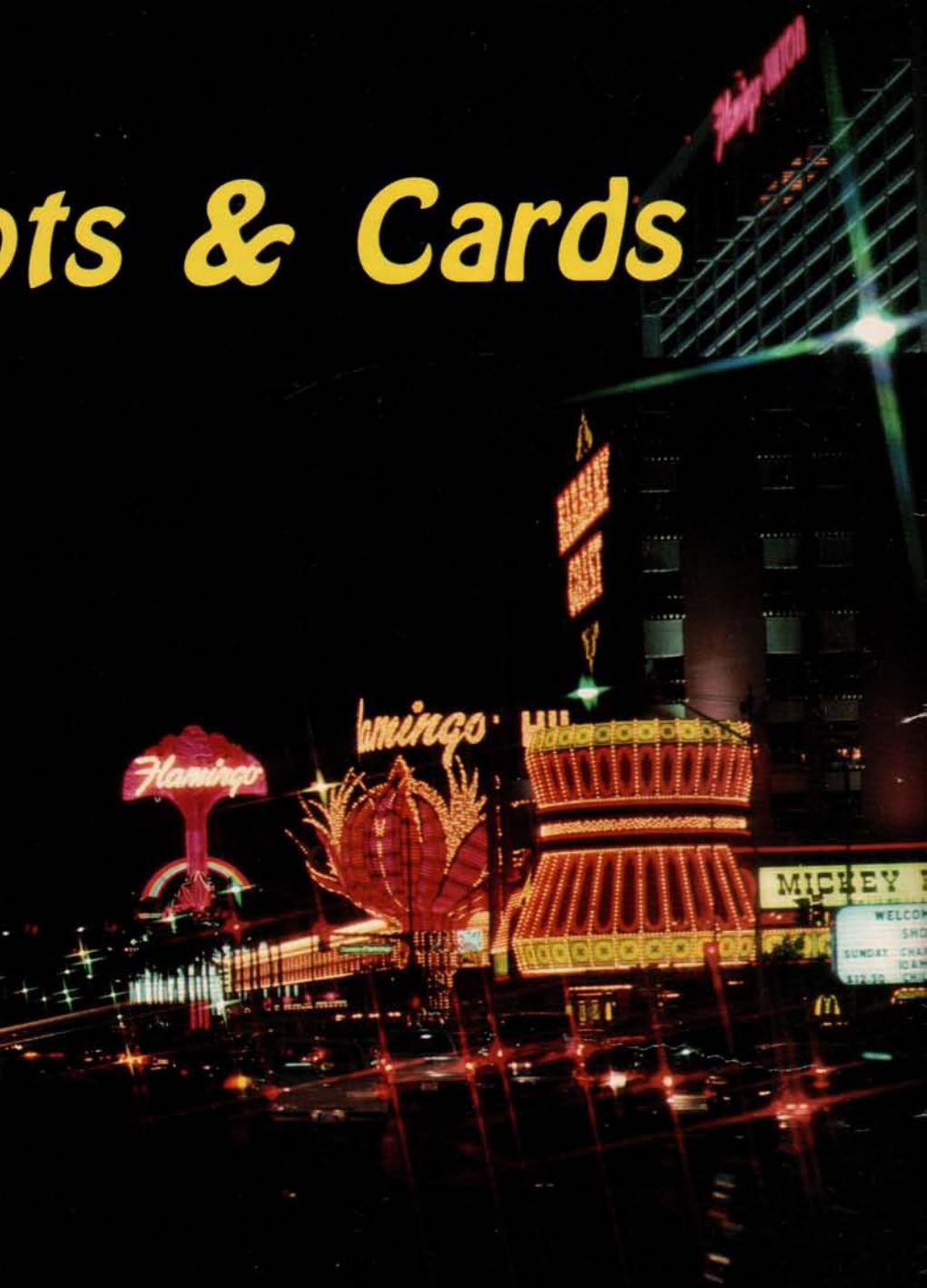
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